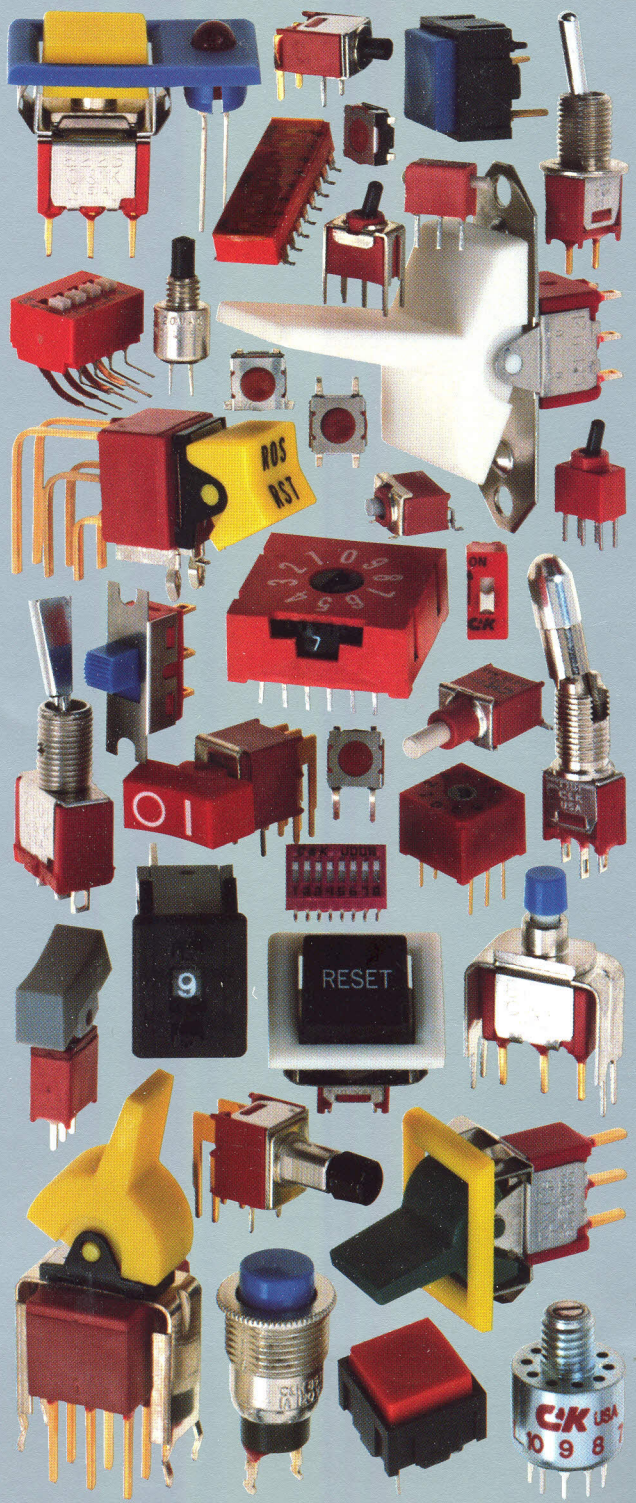
C&K

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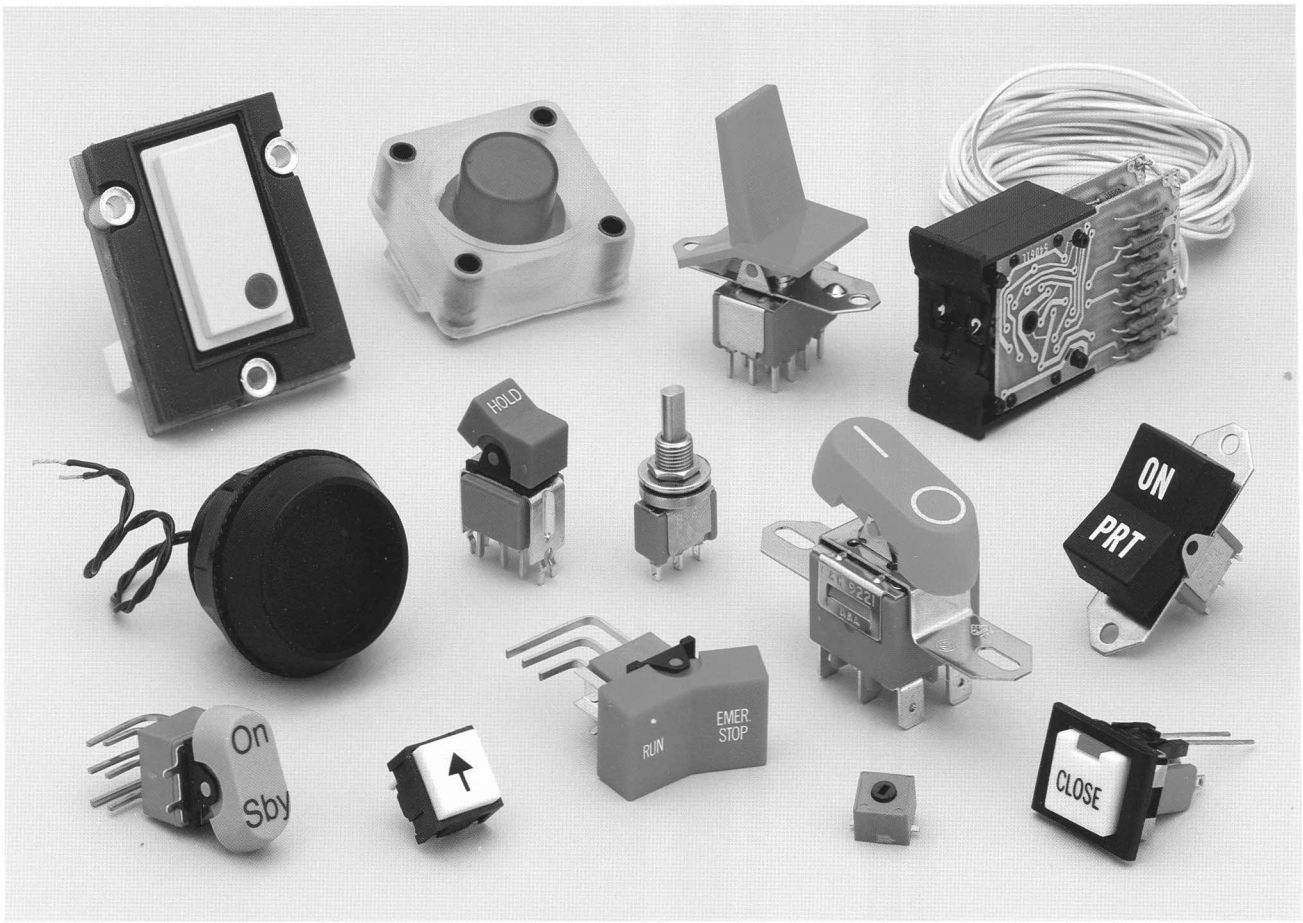
SWITCHES—NEWTON DIVISION



1991–1992

CATALOG NO. 9105

APPLICATION SPECIFIC AND CUSTOM SWITCHES



- **C&K'S CUSTOM PRODUCT DEVELOPMENT GROUP IS READY TO RESPOND TO YOUR SPECIAL NEEDS.**
- **CAD / CAM / CAE, IN-HOUSE PROTOTYPING, FULL RUN PRODUCTION, ADDED VALUE CAPABILITIES.**
- **CUSTOM MARKING, WIRING HARNESSES, 'SMART' CODED SWITCHES, SPECIAL MODIFICATIONS FOR UNIQUE APPLICATIONS.**
- **ALL TECHNOLOGIES AVAILABLE – MEMBRANE, CONDUCTIVE ELASTOMER, PIEZOELECTRIC, ANTI-STATIC, SEALED / PROCESS COMPATIBLE DESIGNS.**

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C&K®

The Primary Source Worldwide®

Quality Statement
C&K's Commitment To Quality

Customer satisfaction is the basic standard by which C&K judges itself as the major supplier of electromechanical switches to the electronics industry. Consistent high quality is the foundation of our philosophy and the cornerstone of our business.

It is therefore our policy to:

* *Provide products that consistently meet or exceed the highest quality expectations of our valued customers.*
* *Actively pursue and encourage programs that strive to ensure excellence in quality.*
* *Instill in our employees the concept that quality is our first priority and that Best-In-Class is an achievable goal.*

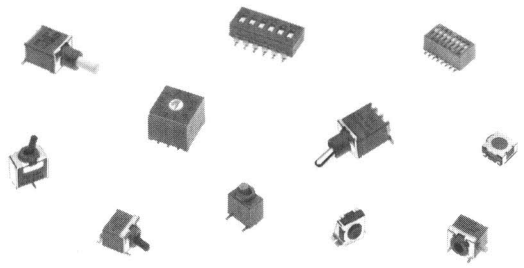
Quality is not an option at C&K. It is C&K's commitment to total customer satisfaction.

James E. Walsh
President

Philip R. Felton
Director of Quality

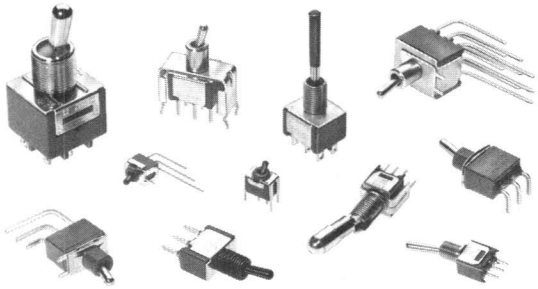
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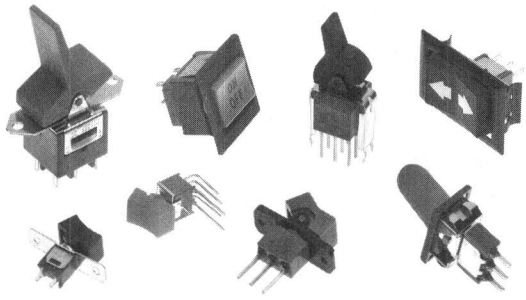
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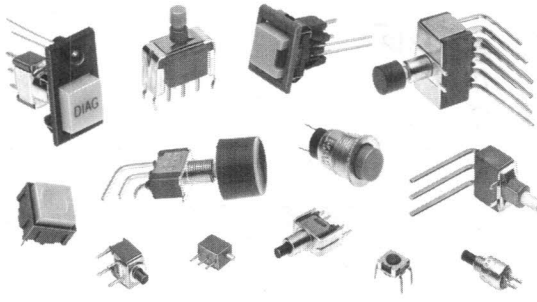
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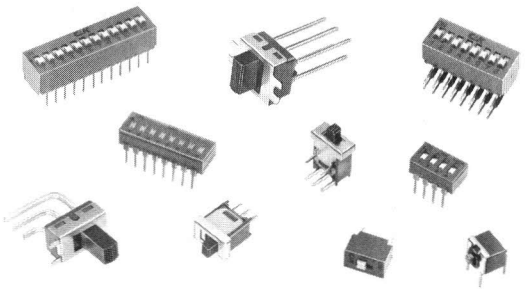
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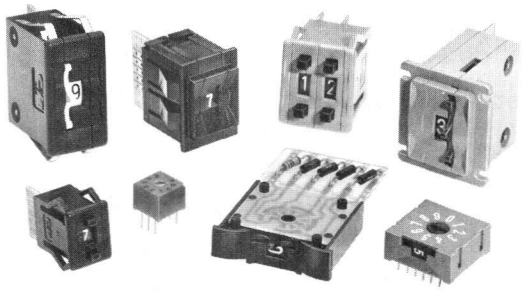
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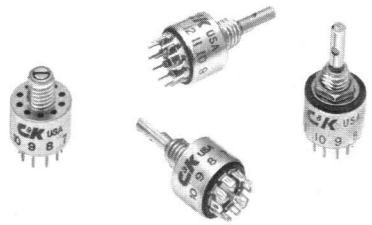
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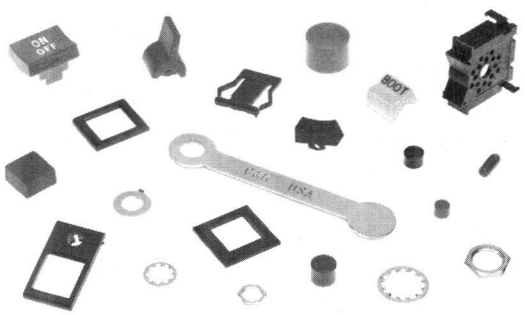
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ET	Sealed Surface Mount Tiny Toggle Switches	A-14 thru A-15
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	8060	D-47 thru D-56
	8500	D-59 thru D-62
	8600	D-57 thru D-58
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	GT	A-4 thru A-7
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	LD	A-3
	UD	A-2
	3D	A-19 thru A-21
Thumbwheel Switches	S2	F-18 thru F-23
	SF	F-24 thru F-34
	SR	F-24 thru F-34
	3	F-35 thru F-46
	3M	F-5 thru F-7
Tiny Switches	EP	A-16 & D-4 thru D-9
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		B-6 thru B-11
		C-2 thru C-6
	T	B-12 thru B-17
		C-7 thru C-11
	TP	D-10 thru D-16
	TS	E-7 thru E-9
	3U	F-8 thru F-12
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		B-6 thru B-11
	GT	A-4 thru A-7
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	T	B-12 thru B-17
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	9000	B-47 thru B-52
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	GS	A-11 thru A-13
		E-5 thru E-6
	GT	A-4 thru A-7
		B-2 thru B-5
	UD	A-2

WELCOME to C&K's newest NEWTON DIVISION SWITCH CATALOG. C&K manufactures the most complete line of miniature, subminiature and ultra-miniature toggle, rocker, leverhandle, pushbutton, illuminated, slide, rotary, coded, DIP, membrane, sealed/process compatible and surface mounted switches. We are *THE PRIMARY SOURCE WORLDWIDE* for switches with unmatched quality and consistently superior performance.

Millions of switch models and option combinations can be ordered from this catalog. Each switch section has either a selection of complete switch part numbers, or a listing of option choices easily combined to build a part number (BUILD-A-SWITCH). Complete HOW TO ORDER information is provided in each switch section, and our Sales Engineers are always ready to assist you with special needs.

Dimensions, operating characteristics, specifications and materials shown in this catalog are subject to change without notice.

AGENCY APPROVALS

Most C&K switch series offer models that are suitable for power switching, and are available with approvals by one or more of the following listing agencies:

UL	FILE NO.:	E42363. Recognized under the component program of Underwriters Laboratories Inc.
CSA	FILE NOS.:	LR29210 (Newton, MA – USA)
		LR49546 (Clayton, NC – USA)
		LR47724 (England)
		LR47725 (Hong Kong)
VDE	FILE NO.:	8869–4401
SEV	FILE NO.:	81.1162.01
SEMKO ...	FILE NO.:	43–63118/1–6

Some switches are supplied with agency approvals automatically when ordered with the appropriate contact materials (for example: E Series, 8500 Series). In some series, switches have agency approvals only when specific model numbers are selected (example: 7000 Series, 8020 Series). Otherwise, no approvals appear on the switches. See the appropriate switch section for specific ratings, agency approvals and other specifications. Also see CONTACT MATERIAL & APPLICATION RECOMMENDATIONS, page X.

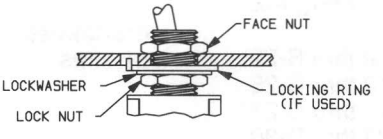
At C&K, we are continuously upgrading our agency certifications, and adding new models and options. Consult the factory with your needs if the approval that you require does not appear.

Note: G and L contact materials are electrically equivalent to B, Q, K and M contact materials and can be used where either dry circuit* or power conditions are encountered. However, when the dry circuit rating is exceeded, the gold plating is removed from the contact interface and the switch cannot then be used in dry circuits. G or L contact material should be specified where UL approval is required on a switch used in a dry circuit application.

* Dry circuit = conditions where no arcing occurs during switching, i.e. 0.4 VA max. @ 20 V AC or DC max.

PANEL MOUNT ASSEMBLY

TYPICAL ASSEMBLY WITH LOCKING RING



To avoid damaging front of panel, always tighten assembly with back-of-panel lock nut.
Please Note: It is recommended that lock nut always be used with non- flanged bushings.
K-K18 ACTUATORS: Overtightening mounting nut may cause actuator to bind.

LED INFORMATION

SWITCHES WITH LED SUPPLIED: J85, J86, J95, J96 OPTIONS:

Rectangular LED's are supplied on 8020 Series pushbutton switches with J85 and J95 options, and 8060 Series pushbutton switches with J86 and J96 options. These LED's are factory installed and are not replaceable. The following specifications apply:

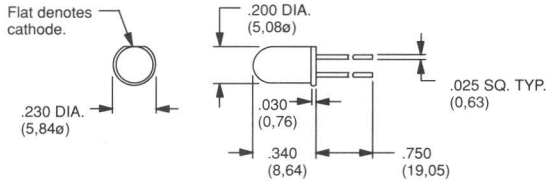
COLOR	TYP. INTENSITY	TYP. FORWARD VOLTAGE	TYP. FORWARD CURRENT	MAX. RATINGS AT 25°C AMBIENT TEMPERATURE		
				FORWARD VOLTAGE	CONTINUOUS FORWARD CURRENT	POWER DISSIPATION
Green	2.5 mcd	2.1V	20 mA	2.5V	50 mA	100 mW
Red*	0.5 mcd					
Yellow	3.0 mcd					

Process information: Soldering to LED leads must be completed within 5 seconds at 500°F (260°C) maximum.
CAUTION: Circuit elements must limit forward current of LED to 50mA max. continuous.
*Extra-bright red LED available (typ. intensity 4.5 mcd), consult factory.

SWITCHES NOT SUPPLIED WITH LED: J52, J62, J82, J84, J92 OPTIONS:

LED's are not supplied with J52, J62, J82, J84 and J92 options, see 7000 Series Rocker and Lever Handle Switches, 8020, 8060, 8600 and TP Series Pushbutton Switches. LED snaps into switch frame surrounding actuator, and is wired externally. Recommended dimensions, ratings and sources are below.

RECOMMENDED LED DIMENSIONS



TYPICAL LED RATINGS

Forward Voltage: 2.3V
Current: 50mA
Power: 100 mW
Max. Reverse Voltage: 5V

SEALED / PROCESS COMPATIBLE SWITCHES

C&K has responded to the industry by developing a large family of sealed, washable, process compatible switches that are able to withstand today's most common machine soldering and cleaning processes. These switches are available in miniature, subminiature and the newest ultra–miniature package sizes, and include both thru–hole and surface mount terminal styles. They withstand the temperatures associated with the latest vapor phase and infrared reflow techniques. Flux and aqueous or solvent cleaning solutions are not allowed to enter the contacts during cleaning, therefore the switches can be installed on P.C. boards along with other components. No special handling is required.

High temperature housing materials, epoxy terminal sealing and ultrasonically welded assemblies are employed, along with actuator o–ring seals (disposable splashproof boots or tape seal on some models). Every production lot of C&K sealed switches is audited to meet the 85°C Flourinert 60 second immersion test. Other manufacturers claim to build sealed products, C&K delivers – time after time! A complete listing of C&K Sealed / Process Compatible Switches is given below.

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KT Series	D–63
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GS Series	E–5
3D Series	F–2

UNSEALED SWITCHES – SOLDERING AND CLEANING

Many manually actuated switches are **not** totally sealed components. Most manufacturing and field problems experienced by users of unsealed miniature switches are caused by contamination of the internal switch contacts during assembly, i.e., **during soldering and cleaning processes**. Switches may become intermittent, especially in low power applications, and these intermittencies may become apparent during factory testing or later in the field. These failures may not be immediately recognized as a process problem, but are assumed to be a product deficiency. Care during soldering and cleaning can prevent most process contamination problems encountered.

Contamination can occur in both hand soldering and machine soldering processes. Hand soldering and cleaning are acceptable with properly trained personnel, small diameter solder (.030–.040 in.) and low wattage soldering irons (25-40 watts max.). Do not immerse or spray the unsealed areas of the switches with cleaners during flux removal.

Most C&K switches have epoxy terminal sealing standard, and are compatible with 'bottom–wash' PC board cleaning methods. Other techniques such as vapor phase and infrared reflow are recommended for sealed / process compatible switches only. These products have the required temperature and contamination resistance.

CONTACT MATERIAL & APPLICATION RECOMMENDATIONS

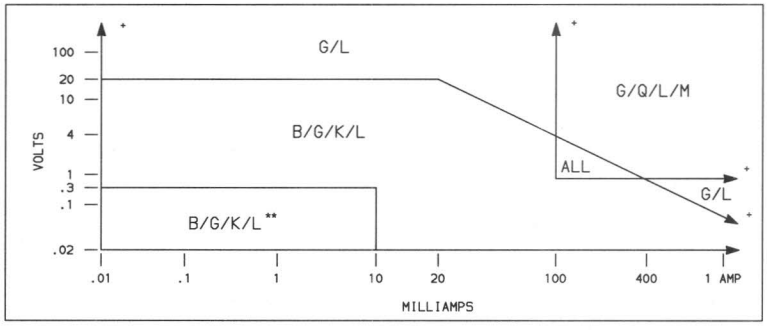
Most C&K switches offer three contact material options: gold, silver, and gold over silver. Switch terminal plating may be gold, silver, or tin–lead. See desired switch section for availability of specific options. Also see AGENCY APPROVALS, page VIII. Figs. 1 & 2 below provide contact material vs. rating recommendations. For special requirements or assistance, consult factory.

CONTACT MATERIAL	CHARACTERISTICS
B and **K**	LOW LEVEL OR DRY CIRCUIT RATED: 0.4 VA max. @ 20 V AC or DC max. Contact material: Gold
Q and **M**	POWER RATED: Ratings from 100mA to 10 AMPS @ 125 V AC are available. See switch sections for applicable ratings and available agency approvals. Contact mat'l = silver.
G and **L**	POWER OR LOW LEVEL / DRY CIRCUIT RATED: Electrically equivalent to B, Q, K and M contact materials and can be used where either low level / dry circuit* or power conditions are encoundered. However, when the dry circuit rating is exceeded, the gold plating is removed from the contact interface and the switch cannot then be used in dry circuits. G or L contact material should be specified where agancy approvals are required on a switch used in a dry circuit application. Contact mat'l = gold over silver.

* Dry Circuit = conditions where no arcing occurs during switching, i.e. 0.4 max. @ 20 V AC or DC max.

Fig. 1

RECOMMENDED CONTACT MATERIALS (VS. VOLTAGE AND CURRENT)

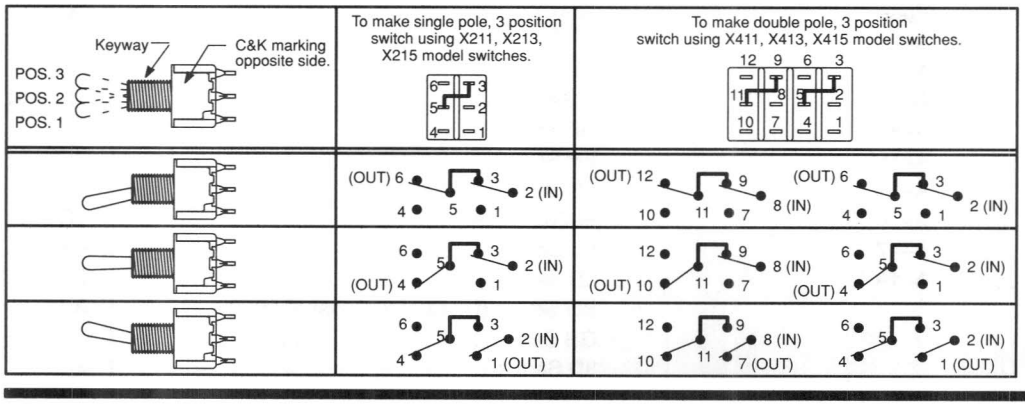


\+ To maximum switch rating.
** For high reliability at these low levels, extra gold plating recommended, consult factory.

Fig. 2

WIRING FOR 3-WAY SWITCHES

3-Position toggle and rocker switches with ON-ON-ON switch functions may be externally wired for '3-way' function. See wiring diagram and schematics, below. Note that jumpers are added by customer.

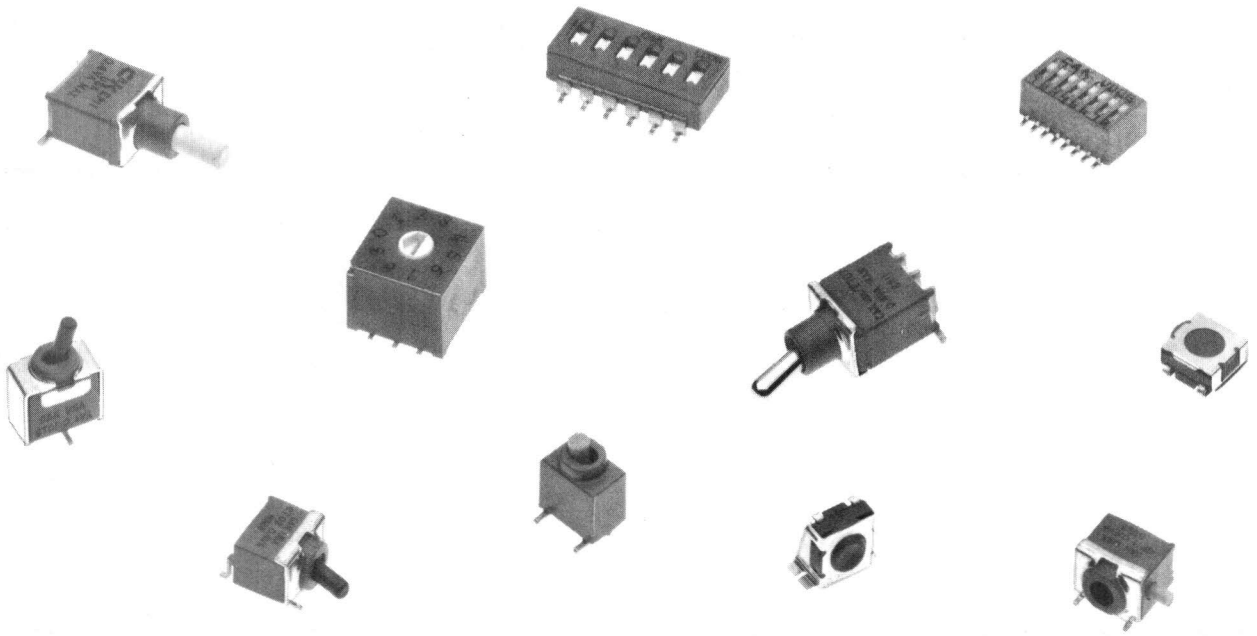


These switch series have one or more models that may be wired to achieve SP3T or DP3T functions:

5000 and L Series
7000 and U Series
E Series
ET Series
T Series

SECTION A

SURFACE MOUNTED SWITCHES



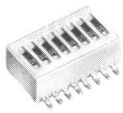
UD Series	Sealed Ultra-Miniature Surface Mount DIP Switches	A-2
LD Series	Sealed Low Profile Surface Mount DIP Switches	A-3
GT Series	Sealed Ultra-Miniature Surface Mount Toggle Switches	A-4 thru A-7
GP Series	Sealed Ultra-Miniature Surface Mount Pushbutton Switches	A-8 thru A-10
GS Series	Sealed Ultra-Miniature Surface Mount Slide Switches	A-11 thru A-13
ET Series	Sealed Surface Mount Tiny Toggle Switches	A-14 thru A-15
EP Series	Sealed Surface Mount Tiny Pushbutton Switches	A-16
KT Series	Sealed Surface Mount Miniature Key Switches	A-17 thru A-18
3D Series	Sealed Surface Mount DIP Coded Rotary Switches	A-19 thru A-21

UD Series

AVAILABLE SOON

Sealed* Ultra-Miniature Surface Mount DIP Switches

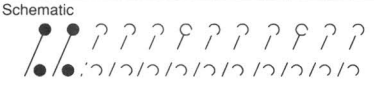
* Process sealed – withstands soldering and cleaning processes.

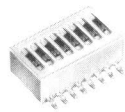

- **8 MODELS AVAILABLE – SPST – 2, 3, 4, 5, 6, 8, 10, 12 POSITIONS.**
- **RECESSED SLIDE ACTUATORS AND POSITIVE DETENT – PREVENT ACCIDENTAL ACTUATION.**
- **PROCESS SEALED CONSTRUCTION – WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES – REMOVABLE POLYIMIDE TOP TAPE SEAL STD.**
- **DESIGNED FOR SURFACE MOUNTING – HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **REDUNDANT PRECIOUS METAL CONTACTS ENSURE RELIABLE SWITCHING.**
- **ULTRA-MINIATURE DESIGN – .050 IN. TERMINAL SPACING.**
- **TIN–LEAD ALLOY COATS ALL SIDES AND ENDS OF TERMINALS FOR JOINT INTEGRITY.**

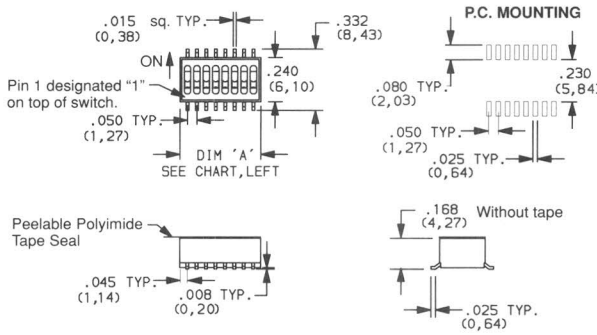
PART NO.	NO. POS.	DIM. 'A'
UD02S	2	.140 (3,56)
UD03S	3	.190 (4,83)
UD04S	4	.240 (6,10)
UD05S	5	.290 (7,37)
UD06S	6	.340 (8,64)
UD08S	8	.440 (11,18)
UD10S	10	.540 (13,72)
UD12S	12	.640 (16,26)

Schematic



SPST





Part No. Shown: UD08S

HOW TO ORDER

Complete part numbers for UD SERIES ULTRA-MINIATURE SURFACE MOUNT DIP SWITCHES are shown above. All switches supplied in 'OFF' position on embossed antistatic tape and reels per EIA 481A. Rigid dispensing tubes also available, consult factory.

SPECIFICATIONS

SWITCH FUNCTION: SPST– 2, 3, 4, 5, 6, 8, 10, 12 pos.

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.

MECHANICAL & ELECTRICAL LIFE: 2,000 make-and-break cycles at full load, each circuit.

CONTACT RESISTANCE: Below 30 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between adjacent terminals.

STORAGE & OPERATING TEMPERATURE: -40°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches supplied on embossed antistatic tape and reels per EIA 481A. Switch pos. 1 denotes pin no. 1. All switch actuators in 'OFF' position std. Rigid dispensing tubes also available, consult factory.

MATERIALS

CASE & COVER: Glass filled LCP (UL 94V-0).

ACTUATOR: Glass filled PES (UL 94V-0).

CONTACTS: Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate. Tin-lead coats all sides and ends of terminals. All terminals insert molded.

TAPE SEAL: Polyimide.

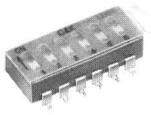
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

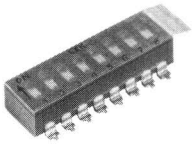
CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

LD Series

Sealed* Low Profile Surface Mount DIP Switches

* Process sealed – withstands soldering and cleaning processes.





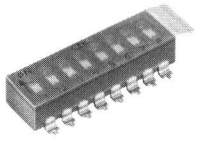
- **LOW PROFILE DESIGN – SPST – 4, 6, 8 POSITIONS.**
- **REDUNDANT PRECIOUS METAL CONTACTS ENSURE RELIABLE SWITCHING.**
- **PROCESS SEALED CONSTRUCTION – WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES – REMOVABLE POLYIMIDE TOP TAPE SEAL STD.**
- **RECESSED SLIDE ACTUATORS AND POSITIVE DETENT – PREVENT ACCIDENTAL ACTUATION.**
- **TIN–LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**
- **DESIGNED FOR SURFACE MOUNTING – HIGH TEMPERATURE MATERIALS (UL 94V–0).**

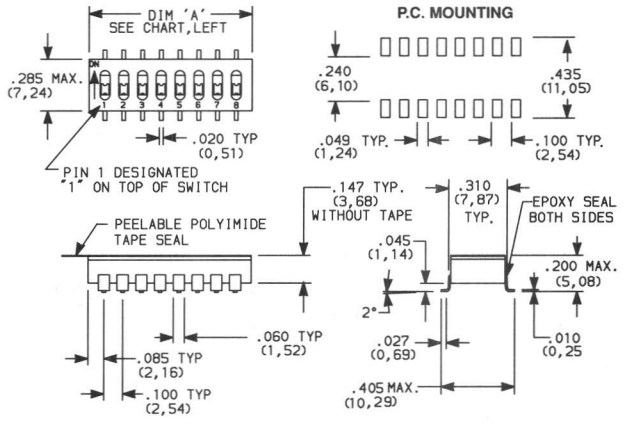
PART NO.	NO. POS.	DIM. 'A'
LD04S	4	.470 (11,94)
LD06S	6	.670 (17,02)
LD08S	8	.870 (22,10)

Schematic



SPST





Part No. Shown: LD08S

HOW TO ORDER

Complete part numbers for LD SERIES SEALED LOW PROFILE SURFACE MOUNT DIP SWITCHES are shown above. All switches supplied in 'OFF' position and in rigid dispensing tubes. Tape and reel packaging per EIA 481A also available, consult factory. Additional LD Series thru-hole PC mount models – see catalog section E, page E-2.

SPECIFICATIONS

SWITCH FUNCTION: SPST– 4, 6, 8, pos.

CONTACT RATING:
Carry: 100 mA max. @ 50 V DC.
Switch: 100 mA max @ 5 V DC or 25 mA max. @ 25 V DC.

MECHANICAL & ELECTRICAL LIFE: 2,000 make-and-break cycles at full load, each circuit.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between adjacent terminals.

CAPACITANCE: 5 pF max. between adjacent terminals.

STORAGE & OPERATING TEMPERATURE: -40°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches supplied in rigid dispensing tubes. Switch pos. 1 denotes pin no. 1. All switch actuators in "OFF" position std. Tape and reel packaging per EIA 481A also available, consult factory.

MATERIALS

CASE & COVER: Glass filled polyester (PET), flame retardant (UL 94V-0).

ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

CONTACTS: Precious metal over copper alloy..

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

TAPE SEAL: Polyimide.

TERMINAL SEAL: Epoxy. All terminals insert molded.

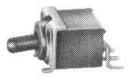
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

GT Series

NEW DP Models

Sealed* Ultra-Miniature Surface Mount Toggle Switches

* Process sealed – withstands soldering and cleaning processes.


- **SIX SURFACE MOUNT TERMINAL STYLES – .050 AND .100 IN. SPACING AVAILABLE.**
- **PROCESS COMPATIBLE – WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES – HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **SEALED CONSTRUCTION – INTERNAL ACTUATOR O-RING, EPOXY BASE SEAL.**
- **TIN–LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**
- **NEW TWO POLE MODEL – SAME SIZE AS SINGLE POLE SWITCH.**
- **AVAILABLE ON TAPE AND REEL FOR AUTOMATED PLACEMENT.**

PART NO.	SWITCH FUNCTION POS. 1	POS. 2	POS. 3
GT01MSAKE	ON	NONE	ON
GT03MSAKE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic SPDT		2 (COMM), 1, 3	
GT02MSAKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic SPST		1, 3	

SP MODELS WITH SA SURFACE MOUNT TERMINALS

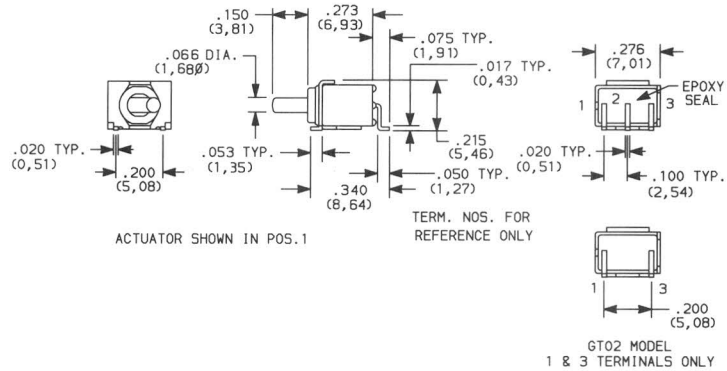


GT01
SPDT



GT02
SPST

SPST and SPDT



PART NO.	SWITCH FUNCTION POS. 1	POS. 2	POS. 3
GT01MSA1KE	ON	NONE	ON
GT03MSA1KE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic SPDT		2 (COMM), 1, 3	
GT02MSA1KE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic SPST		1, 3	

SP MODELS WITH SA1 SURFACE MOUNT TERMINALS

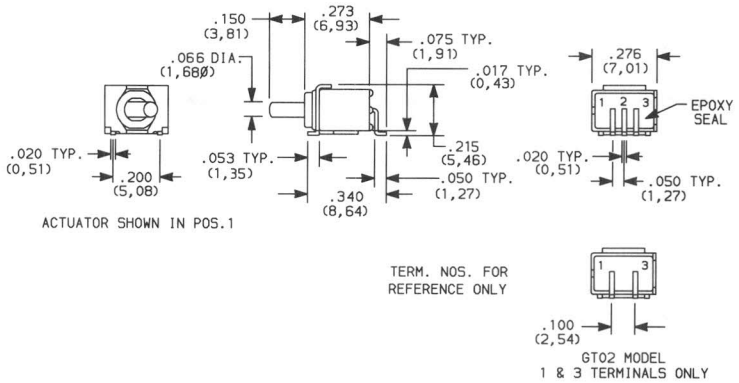


GT01
SPDT



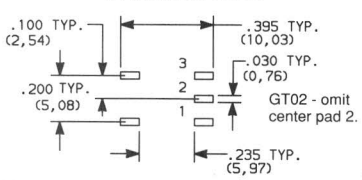
GT02
SPST

SPST and SPDT

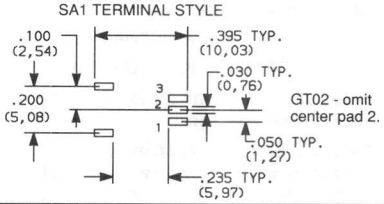


P.C. MOUNTING

SA TERMINAL STYLE



SA1 TERMINAL STYLE

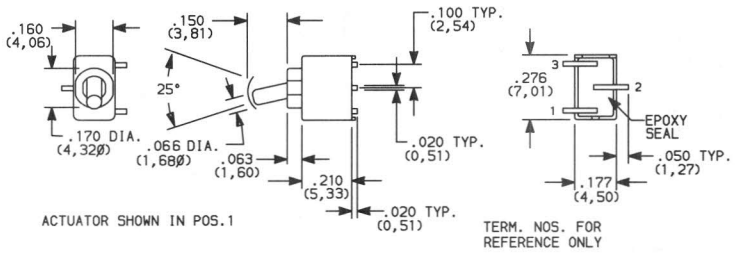


Suggested mounting patterns, see CAUTION page A-7.

SP MODELS WITH SC SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNCTION POS. 1	POS. 2	POS. 3
GT01MSCKE	ON	NONE	ON
GT03MSCKE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic SPDT		2 (COMM), 1, 3	





SPDT

Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

DP MODELS WITH SC SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNCTION POS. 1	POS. 2	POS. 3
GT21MSCKE	ON	NONE	ON
GT23MSCKE	ON	OFF	ON
Conn. Terms.	2-3,5-6	OPEN	2-1,5-4
Schematic DPDT		2 (COMM), 5, 1, 3, 4, 6	
GT22MSCKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1,6-4
Schematic DPST		3, 6, 1, 4	

NEW

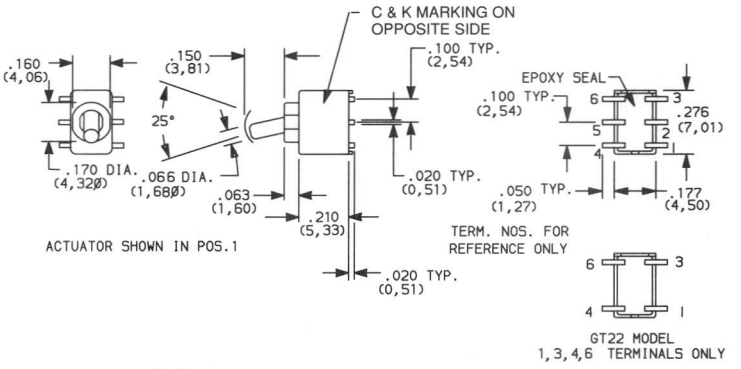


GT21 DPDT



GT22 DPST

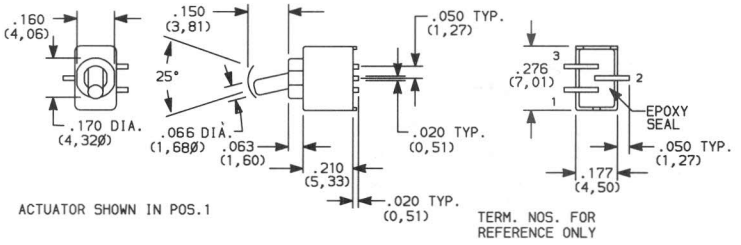
DPST and DPDT



SP MODELS WITH SC1 SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNCTION POS. 1	POS. 2	POS. 3
GT01MSC1KE	ON	NONE	ON
GT03MSC1KE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic SPDT		2 (COMM), 1, 3	



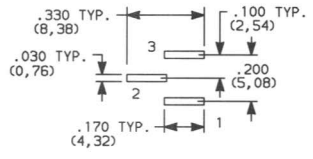


SPDT

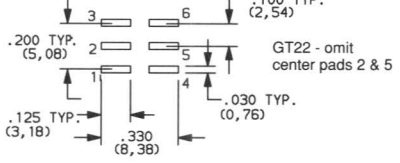
Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

P.C. MOUNTING

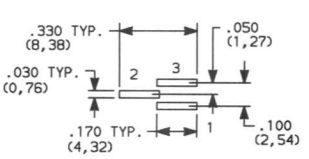
SC TERMINAL STYLE
GT0X



SC TERMINAL STYLE
GT2X



SC1 TERMINAL STYLE
GT0X



Suggested mounting patterns, see CAUTION page A-7.

GT Series — NEW DP Models

Sealed* Ultra-Miniature Surface Mount Toggle Switches

* Process sealed – withstands soldering and cleaning processes.

SP MODELS WITH SV1 SURFACE MOUNT TERMINALS

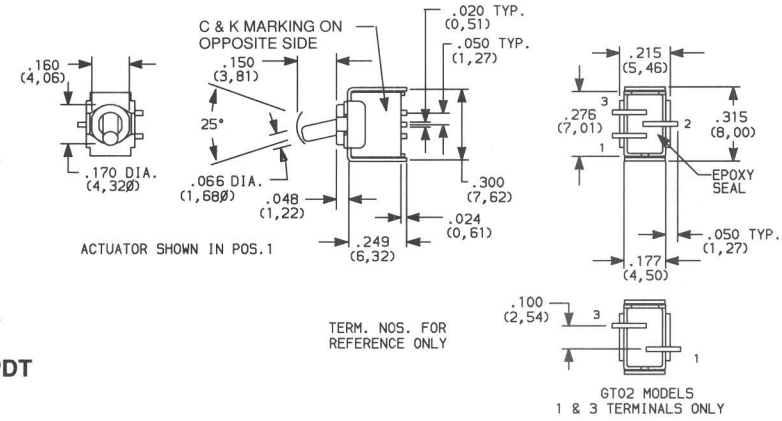
PART NO.	SWITCH FUNCTION POS. 1	POS. 2	POS. 3
GT01MSV1KE	ON	NONE	ON
GT03MSV1KE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic SPDT		2 (COMM), 1, 3	
GT02MSV1KE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic SPST		1, 3	



GT01
SPDT



GT02
SPST



SPST and SPDT

DP MODELS WITH SV SURFACE MOUNT TERMINALS

NEW

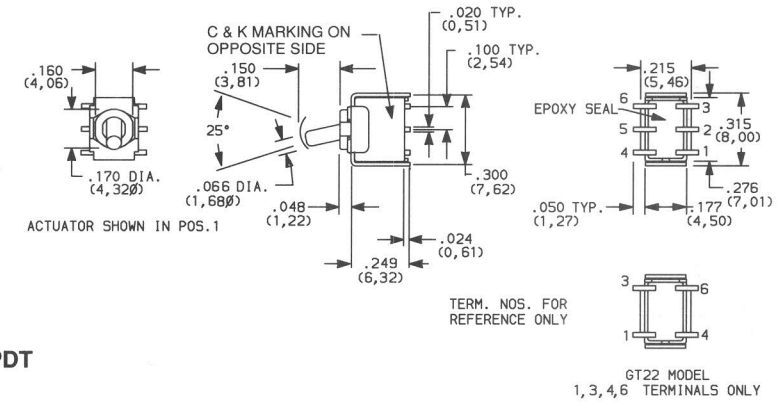
PART NO.	SWITCH FUNCTION POS. 1	POS. 2	POS. 3
GT21MSVKE	ON	NONE	ON
GT23MSVKE	ON	OFF	ON
Conn. Terms.	2-3,5-6	OPEN	2-1,5-4
Schematic DPDT		2 (COMM), 5, 1, 3, 4, 6	
GT22MSVKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1,6-4
Schematic DPST		3, 6, 1, 4	



GT21
DPDT



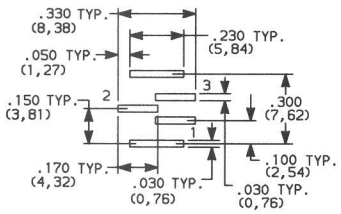
GT22
DPST



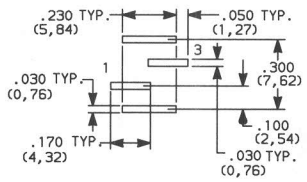
DPST and DPDT

P.C. MOUNTING

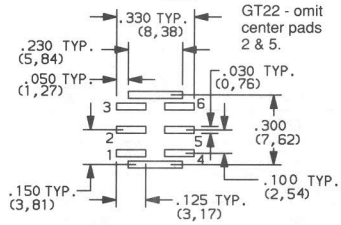
SV1 TERMINAL STYLE
GT01 & GT03



SV1 TERMINAL STYLE
GT02



SV TERMINAL STYLE
GT2X



Suggested mounting patterns, see CAUTION page A-7.

HOW TO ORDER

Complete part numbers for GT SERIES SEALED ULTRA-MINIATURE SURFACE MOUNT TOGGLE SWITCHES are shown on pages A-4 thru A-6. Switches available on embossed antistatic tape and reels per EIA 481A, consult factory. Additional GT Series thru-hole PC mount models – see catalog section B, pages B-2 thru B-5.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.

MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30^0 C to 85^0 C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481A, consult factory.

MATERIALS

HOUSING & BASE: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0), with standard internal o-ring seal.

SWITCH SUPPORT: Brass, tin plated.

MOVABLE CONTACT: Phosphor bronze with gold plate over nickel plate.

STATIONARY CONTACTS: Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

TERMINAL SEAL: Epoxy. All terminals insert molded.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

CAUTION: P.C. mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of P.C. lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

GP Series

Sealed* Ultra-Miniature Surface Mount Pushbutton Switches

* Process sealed – withstands soldering and cleaning processes.





- **FIVE SURFACE MOUNT TERMINAL STYLES – .050 AND .100 IN. SPACING AVAILABLE.**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**
- **SEALED CONSTRUCTION – INTERNAL ACTUATOR O-RING, EPOXY BASE SEAL.**
- **PROCESS COMPATIBLE–WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES–HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **SPST AND SPDT MOMENTARY MODELS AVAILABLE.**
- **AVAILABLE ON TAPE AND REEL FOR AUTOMATED PLACEMENT.**

SP MODELS WITH SA SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GP11MSAKE	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 • • 3	
GP12MSAKE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic SPDT	NC 1 • 2 (COMM) • 3 NO	

MOM.=MOMENTARY

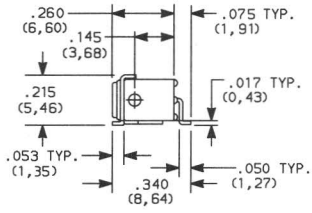


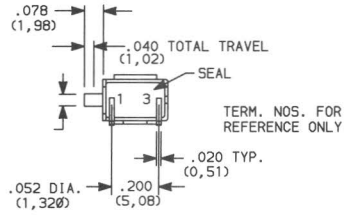
GP11 SPST

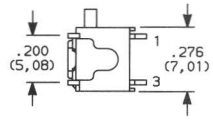


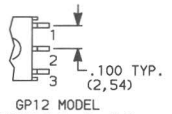
GP12 SPDT

SPST and SPDT









GP12 MODEL
TERMINALS 1, 2, & 3

SP MODELS WITH SA1 SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GP11MSA1KE	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 • • 3	
GP12MSA1KE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic SPDT	NC 1 • 2 (COMM) • 3 NO	

MOM.=MOMENTARY

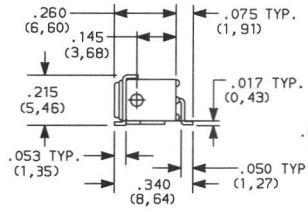


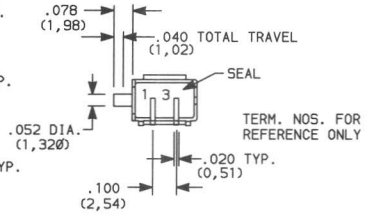
GP11 SPST

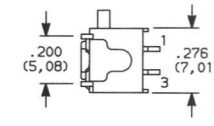


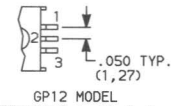
GP12 SPDT

SPST and SPDT





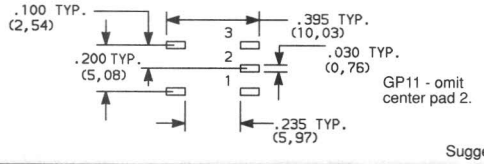




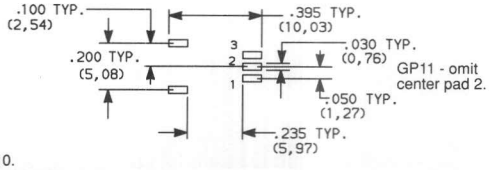
GP12 MODEL
TERMINALS 1, 2, & 3

P.C. MOUNTING

SA TERMINAL STYLE



SA1 TERMINAL STYLE



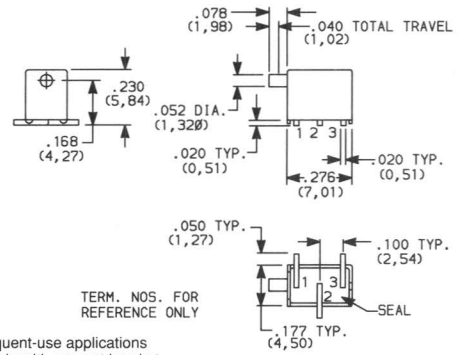
Suggested mounting patterns, see CAUTION page A-10.

SP MODELS WITH SC SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GP12MSCKE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic SPDT	NC 1 ● 2 (COMM) ● 3 NO	

MOM.=MOMENTARY





SPDT

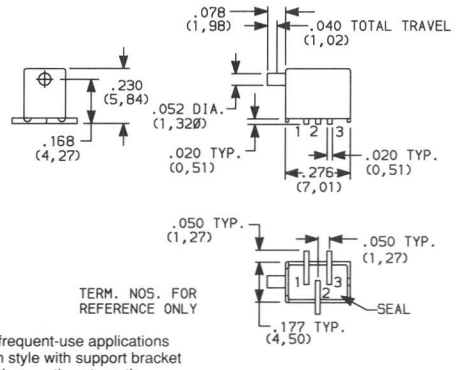
Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

SP MODELS WITH SC1 SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GP12MSC1KE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic SPDT	NC 1 ● 2 (COMM) ● 3 NO	

MOM.=MOMENTARY





SPDT

Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

SP MODELS WITH SV1 SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GP11MSV1KE	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 ● ● 3	
GP12MSV1KE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic SPDT	NC 1 ● 2 (COMM) ● 3 NO	

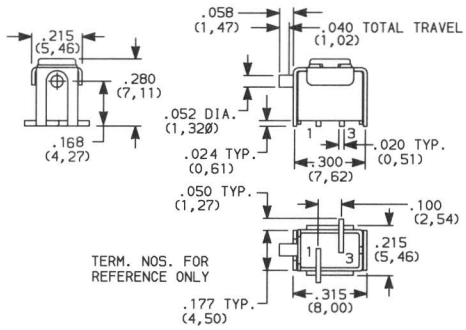
MOM.=MOMENTARY

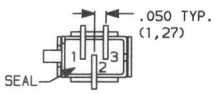


GP11
SPST



GP12
SPDT



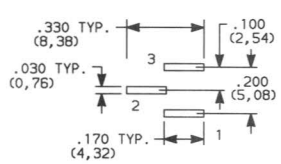


GP12 MODEL
TERMINALS 1, 2, & 3

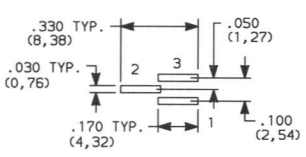
SPST and SPDT

P.C. MOUNTING

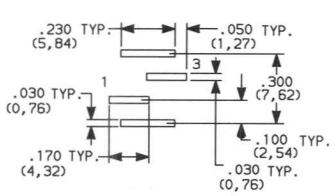
SC TERMINAL STYLE



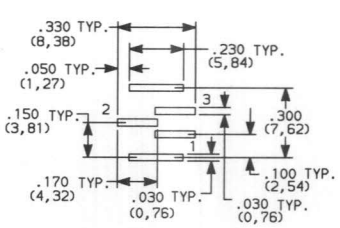
SC1 TERMINAL STYLE



SV1 TERMINAL STYLE
GP11



SV1 TERMINAL STYLE
GP12



Suggested mounting patterns, see CAUTION page A-10.

Sealed* Ultra-Miniature Surface Mount Pushbutton Switches

* Process sealed – withstands soldering and cleaning processes.

HOW TO ORDER

Complete part numbers for GP SERIES SEALED ULTRA-MINIATURE SURFACE MOUNT PUSHBUTTON SWITCHES are shown on pages A-8 and A-9. Switches available on embossed antistatic tape and reels per EIA 481A, consult factory. Additional GP Series thru-hole PC mount models – see catalog section D, pages D-2 and D-3.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.

MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30° C to 85° C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481A, consult factory.

MATERIALS

HOUSING & BASE: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0), with standard internal o-ring seal.

SWITCH SUPPORT: Brass, tin plated.

MOVABLE CONTACT: Beryllium copper with gold plate over nickel plate.

STATIONARY CONTACTS: Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

TERMINAL SEAL: Epoxy. All terminals insert molded.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of PC lands to suit i ndividual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

Sealed* Ultra-Miniature Surface Mount Slide Switches

* Process sealed – withstands soldering and cleaning processes.





- FIVE SURFACE MOUNT TERMINAL STYLES – .050 AND .100 IN. SPACING AVAILABLE.
- TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.
- SEALED CONSTRUCTION – INTERNAL ACTUATOR SEAL, EPOXY BASE SEAL.
- PROCESS COMPATIBLE–WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES–HIGH TEMPERATURE MATERIALS (UL 94V-0).
- SPST AND SPDT MODELS AVAILABLE.
- AVAILABLE ON TAPE AND REEL FOR AUTOMATED PLACEMENT.

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GS01MSAKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic SPDT	1 ● ● 2 (COMM) ● 3	
GS02MSAKE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic SPST	3 ● ● 1	

SP MODELS WITH SA SURFACE MOUNT TERMINALS

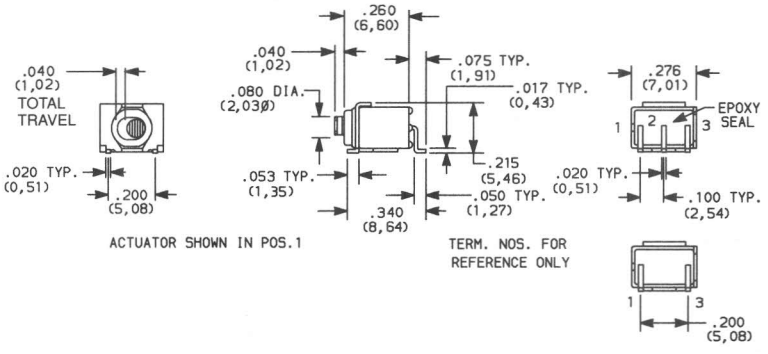


GS01
SPDT



GS02
SPST

SPST and SPDT



PART NO.	SWITCH FUNC. POS. 1	POS. 2
GS01MSA1KE	ON	ON
Conn. Terms.	2-1	2-3
Schematic SPDT	1 ● ● 2 (COMM) ● 3	
GS02MSA1KE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic SPST	3 ● ● 1	

SP MODELS WITH SA1 SURFACE MOUNT TERMINALS

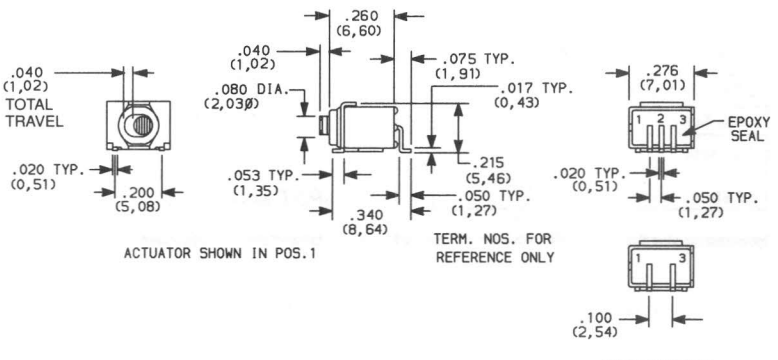


GS01
SPDT



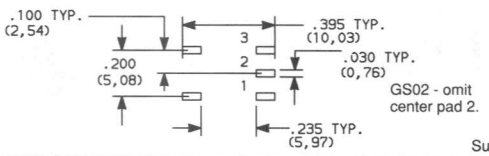
GS02
SPST

SPST and SPDT

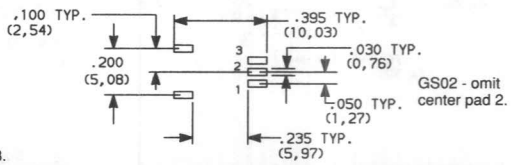


P.C. MOUNTING

SA TERMINAL STYLE



SA1 TERMINAL STYLE

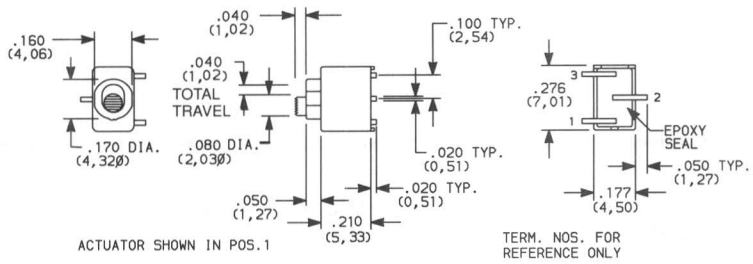


Suggested mounting patterns, see CAUTION page A-13.

SP MODELS WITH SC SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GS01MSCKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic SPDT	1 ● 2 (COMM) ● 3	





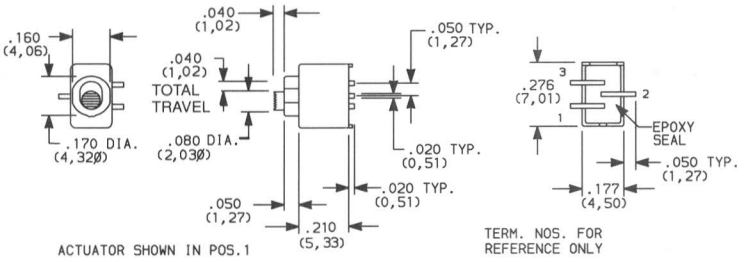
SPDT

Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

SP MODELS WITH SC1 SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GS01MSC1KE	ON	ON
Conn. Terms.	2-1	2-3
Schematic SPDT	1 ● 2 (COMM) ● 3	





SPDT

Recommended for infrequent-use applications only. SV1 termination style with support bracket offers increased switch mounting strength.

SP MODELS WITH SV1 SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GS01MSV1KE	ON	ON
Conn. Terms.	2-1	2-3
Schematic SPDT	1 ● 2 (COMM) ● 3	
GS02MSV1KE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic SPST	3 ● ● 1	

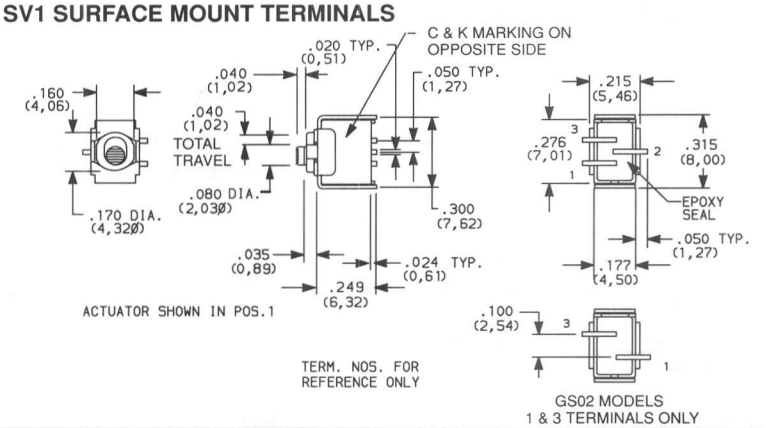


GS01 SPDT



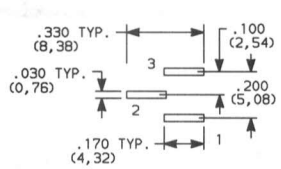
GS02 SPST

SPST and SPDT

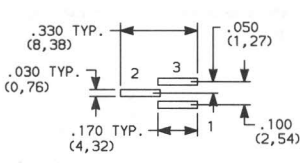


P.C. MOUNTING

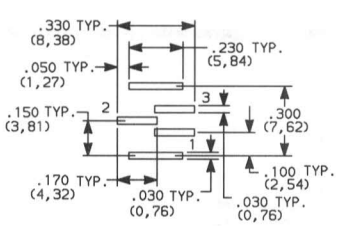
SC TERMINAL STYLE



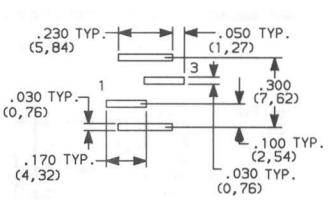
SC1 TERMINAL STYLE



SV1 TERMINAL STYLE GS01



SV1 TERMINAL STYLE GS02



Suggested mounting patterns, see CAUTION page A-13.

HOW TO ORDER

Complete part numbers for GS SERIES SEALED ULTRA-MINIATURE SURFACE MOUNT SLIDE SWITCHES are shown on pages A-11 and A-12. Switches available on embossed antistatic tape and reels per EIA 481A, consult factory. Additional GS Series thru-hole PC mount models – see catalog section E, pages E-5 and E-6.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.

MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30° C to 85° C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481A, consult factory.

MATERIALS

HOUSING & BASE: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

ACTUATOR: Polyetherimide PEI (UL 94V-0), with standard internal o-ring seal.

SWITCH SUPPORT: Brass, tin plated.

MOVABLE CONTACT: Beryllium copper with gold plate over nickel plate.

STATIONARY CONTACTS: Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

TERMINAL SEAL: Epoxy. All terminals insert molded.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

Sealed* Surface Mount Tiny Toggle Switches

* Process sealed – withstands soldering and cleaning processes.





- **NEW – ANTISTATIC PLASTIC ACTUATOR – 9000 V DC STATIC RESISTANCE.**
- **AVAILABLE ON TAPE AND REEL FOR AUTOMATED PLACEMENT.**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**
- **PROCESS COMPATIBLE – WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES – HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **SEALED CONSTRUCTION – INTERNAL ACTUATOR O-RING, WELDED HOUSINGS AND EPOXY TERMINAL SEAL STANDARD.**

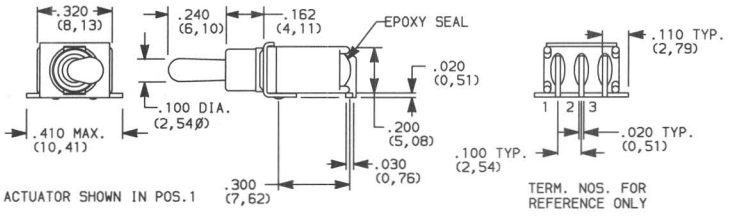
ANTISTATIC – WITH PLASTIC M3 ACTUATOR – SURFACE MOUNT

NEW

PART NO.	SWITCH FUNCTION POS. 1	POS. 2	POS. 3
ET01M3D1SAKE	ON	NONE	ON
ET03M3D1SAKE	ON	OFF	ON
ET05M3D1SAKE	MOM.	OFF	MOM.
ET07M3D1SAKE	ON	OFF	MOM.
ET08M3D1SAKE	ON	NONE	MOM.
Conn. Terms.	2–3	OPEN	2–1
Schematic SPDT		2 (COMM) 1 3	

MOM. = MOMENTARY



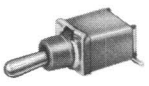


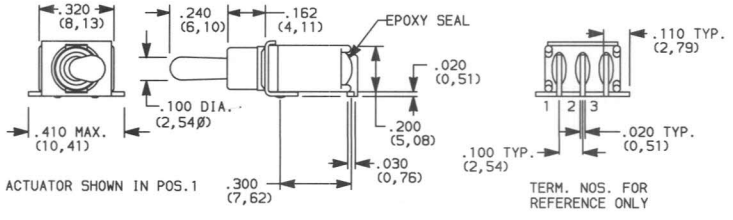
SPDT

WITH CHROME PLATED BRASS M ACTUATOR – SURFACE MOUNT

PART NO.	SWITCH FUNCTION POS. 1	POS. 2	POS. 3
ET01MD1SAKE	ON	NONE	ON
ET03MD1SAKE	ON	OFF	ON
ET05MD1SAKE	MOM.	OFF	MOM.
ET07MD1SAKE	ON	OFF	MOM.
ET08MD1SAKE	ON	NONE	MOM.
Conn. Terms.	2–3	OPEN	2–1
Schematic SPDT		2 (COMM) 1 3	

MOM. = MOMENTARY

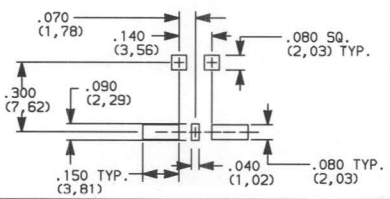




SPDT

P.C. MOUNTING

Suggested mounting pattern, see CAUTION next page.



HOW TO ORDER

Complete part numbers for ET SERIES SEALED SURFACE MOUNT TINY TOGGLE SWITCHES are shown on page A-14. Switches available on embossed antistatic tape and reels per EIA 481A, consult factory. Additional ET Series thru-hole PC mount models – see catalog section B, pages B-6 thru B-11.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.
MECHANICAL & ELECTRICAL LIFE: 60,000 make-and-break cycles at full load on ET01 model. All other models, 30,000 cycles.
CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA.
INSULATION RESISTANCE: 10^9 ohms min.
STATIC RESISTANCE (M3 actuator only): 9000 V DC min @ sea level, actuator to terms.
DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30° C to 85° C.
SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).
PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481A, consult factory. Reel is 13 in. dia., 600 pcs. per reel max. Tape is 32 mm wide. Pitch of switch pockets is 16mm. Tape and cover strip are conductive for use near statically sensitive components.

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).
ACTUATOR: M3 antistatic actuator: PES (UL 94V-0). M actuator: Brass, chrome plated. Internal o-ring seal standard with all actuators.
SWITCH SUPPORT: Brass, tin plated.
CONTACTS: Copper alloy, with gold plate over nickel plate.
TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.
TERMINAL SEAL: Epoxy.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

EP Series

Sealed* Surface Mount Tiny Pushbutton Switches

* Process sealed – withstands soldering and cleaning processes.



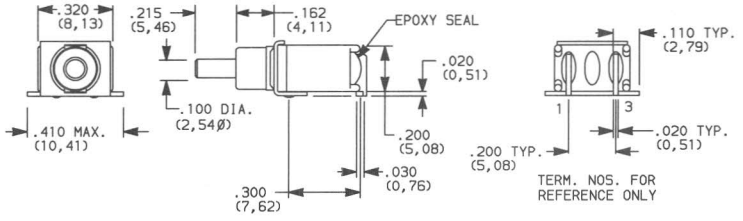
- **PROCESS COMPATIBLE – WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES – HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **SEALED CONSTRUCTION – INTERNAL ACTUATOR O-RING, WELDED HOUSING AND EPOXY TERMINAL SEAL STANDARD.**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**
- **AVAILABLE ON TAPE AND REEL FOR AUTOMATED PLACEMENT.**

SP MODEL WITH SA SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
EP11SD1SAKE	OFF	MOM.
Conn. Terms.	OPEN	1–3
Schematic SPST	1	3

MOM. = MOMENTARY

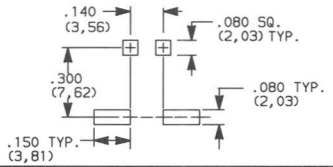




SPST N.O. MOMENTARY

P.C. MOUNTING

Suggested mounting pattern, see CAUTION below.



HOW TO ORDER

Complete part numbers for EP SERIES SEALED SURFACE MOUNT TINY PUSHBUTTON SWITCHES are shown above. Switches available on embossed antistatic tape and reels per EIA 481A, consult factory. Additional EP Series thru-hole PC mount models – see catalog section D, pages D-4 thru D-9. Actuator caps available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.
MECHANICAL & ELECTRICAL LIFE: 60,000 make-and-break cycles at full load.
CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30° C to 85° C.
SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).
PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481A, consult factory. Reel is 13 in. dia., 600 pcs. per reel max. Tape is 32 mm wide. Pitch of switch pockets is 16mm. Tape and cover strip are conductive for use near statically sensitive components.

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).
ACTUATOR: Thermoplastic polyester (UL 94V-0), with standard internal o-ring seal.
SWITCH SUPPORT: Brass, tin plated.
CONTACTS: Copper alloy, with gold plate over nickel plate.
TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.
TERMINAL SEAL: Epoxy.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.





- **ULTRA-MINIATURE LOW PROFILE DESIGN – APPROX. .250 IN. (6 mm) SQ. – THREE SURFACE MOUNT TERMINAL STYLES.**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**
- **AVAILABLE ON TAPE AND REEL FOR AUTOMATED PLACEMENT.**
- **PROCESS COMPATIBLE – WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES – HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **SEALED CONSTRUCTION – INTERNAL SILICONE RUBBER ACTUATOR SEAL AND INSERT MOLDED TERMINALS STANDARD.**

WITH J SURFACE MOUNT TERMINALS

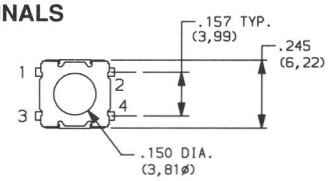
PART NO.	SWITCH FUNC. POS. 1	SWITCH FUNC. POS. 2
KT11BOJM	OFF	MOM.
KT11B1JM	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 2 3 4	

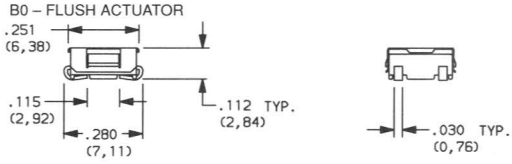
MOM. = MOMENTARY

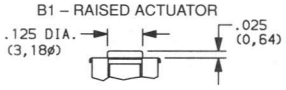

B0


B1

SPST







WITH S SURFACE MOUNT TERMINALS

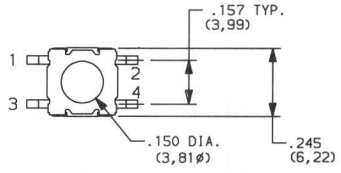
PART NO.	SWITCH FUNC. POS. 1	SWITCH FUNC. POS. 2
KT11BOSM	OFF	MOM.
KT11B1SM	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 2 3 4	

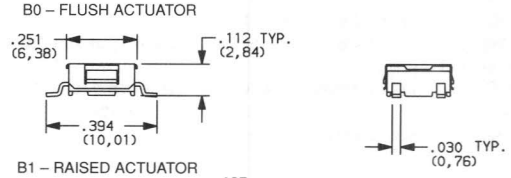
MOM. = MOMENTARY

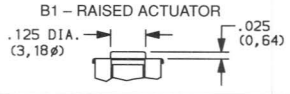

B0


B1

SPST

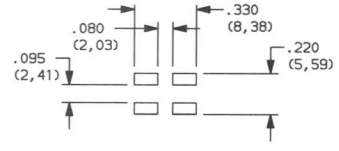




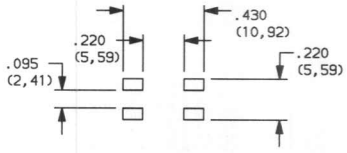


P.C. MOUNTING

J TERMINAL STYLE



S TERMINAL STYLE



Suggested mounting patterns, see CAUTION page A-18.

KT Series NEW

Sealed* Surface Mount Miniature Key Switches

* Process sealed – withstands soldering and cleaning processes.

WITH SA SURFACE MOUNT TERMINALS

PART NO.	SWITCH FUNC. POS. 1	SWITCH FUNC. POS. 2
KT11BOSAM	OFF	MOM.
KT11B1SAM	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1, 2, 3, 4	

MOM. = MOMENTARY



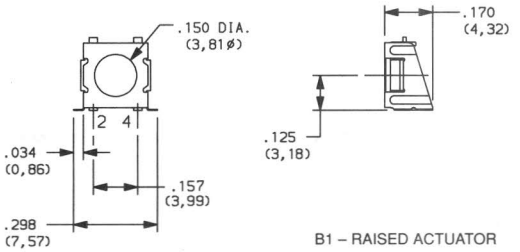
B0



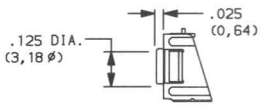
B1

SPST

B0 – FLUSH ACTUATOR

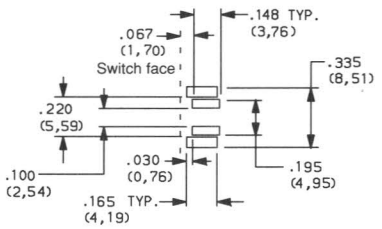


B1 – RAISED ACTUATOR



P.C. MOUNTING

SA TERMINAL STYLE



Suggested mounting patterns, see CAUTION below.

HOW TO ORDER

Complete part numbers for KT SERIES SEALED SURFACE MOUNT MINIATURE KEY SWITCHES are shown above and on page A-17. Switches available on embossed antistatic tape and reels per EIA 481A, consult factory. Additional KT Series thru-hole PC mount models – see catalog section D, page D-63.

SPECIFICATIONS

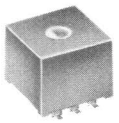
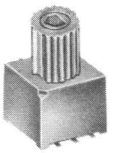
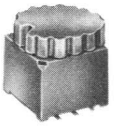
CONTACT RATING: 1.0 VA max. @ 50 V AC or DC max.
MECHANICAL & ELECTRICAL LIFE: 100,000 make-and-break cycles at full load.
CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 250 V RMS min. @ sea level.
OPERATING TEMPERATURE: -40° C to 90° C.
SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).
PACKAGING: Switches supplied on embossed antistatic tape and reels per EIA 481A. Tape and cover strip are conductive for use near statically sensitive components.

MATERIALS

BASE: LCP (UL 94V-0).
ACTUATOR BUTTON AND SEAL: Silicone rubber.
HOUSING: Stainless steel.
SWITCH SUPPORT: Stainless steel, tin plated.
MOVABLE CONTACT: Stainless steel, silver plated.
STATIONARY CONTACTS: Copper alloy, silver plated.
TERMINALS: Copper alloy, with tin-lead alloy over nickel plate. All terminals insert molded.

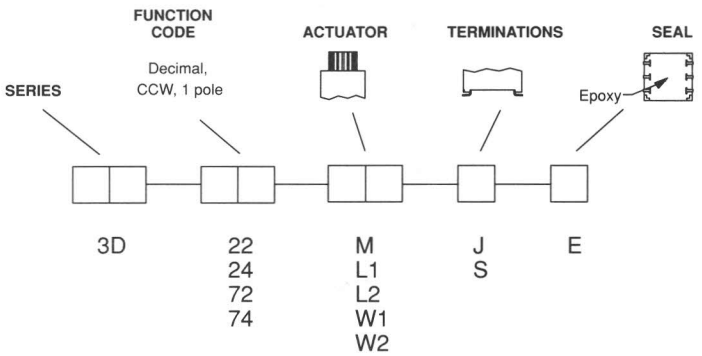
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

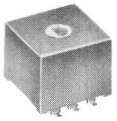
Easy Build-A-Switch:

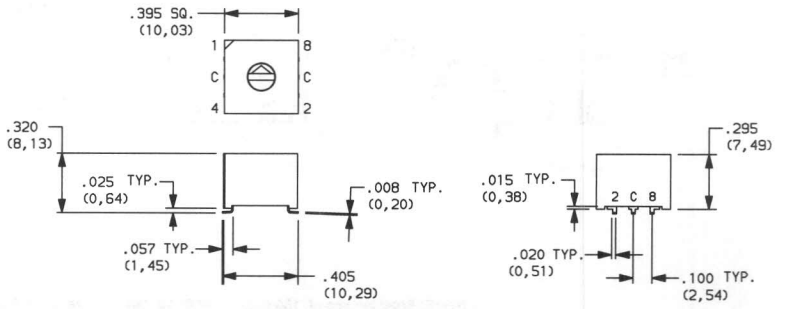
Below is a complete listing of available options for 3D SERIES SEALED SURFACE MOUNT DIP CODED ROTARY SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages A-19 thru A-21. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page A-21. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. Additional 3D Series thru-hole models – see catalog section F, pages F-2 thru F-4.



SERIES

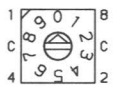
3D





Part No. Shown: 3D__MSE

FUNCTION CODES



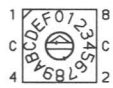
Clockwise rotation when viewed from top.

22 BINARY CODED DECIMAL, 1 POLE, 10 POSITION

WHEEL	COMM. (C) CONN. TO TERM. IND. 1	2	4	8
0				
1	●			
2		●		
3	●	●		
4			●	
5	●		●	
6		●	●	
7	●	●	●	
8				●
9	●			●

24 COMPLEMENT OF BCD, 1 POLE, 10 POSITION

WHEEL	COMM. (C) CONN. TO TERM. IND. $\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$
0	●	●	●	●
1		●	●	●
2	●		●	●
3			●	●
4	●	●		●
5		●		●
6	●			●
7				●
8	●	●	●	
9		●	●	



Clockwise rotation when viewed from top.

72 BINARY CODED HEXADECIMAL, 1 POLE, 16 POSITION

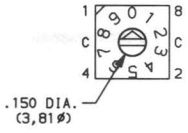
WHEEL	SIGNALS CONN. TO COMMON SIG. C 1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
A		●		●	●
B	●	●		●	●
C			●	●	●
D	●		●	●	●
E		●	●	●	●
F	●	●	●	●	●

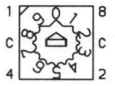
74 COMPLEMENT OF BINARY CODED HEXADECIMAL, 1 POLE, 16 POSITION

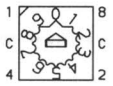
WHEEL	SIGNALS CONN. TO COMMON SIG. C $\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0	●	●	●	●	●
1		●	●	●	●
2	●		●	●	●
3			●	●	●
4	●	●		●	●
5		●		●	●
6	●			●	●
7				●	●
8	●	●	●		●
9		●	●		●
A	●		●		●
B			●		●
C	●	●			●
D		●			●
E	●				●
F					●

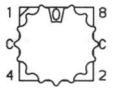
ACTUATOR

M (STD.) **L1** SHAFT **L2** SHAFT **W1** WHEEL **W2** KNOB



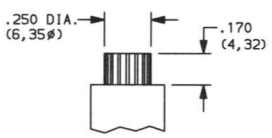


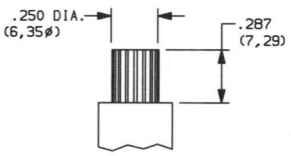


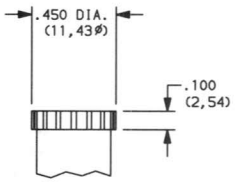


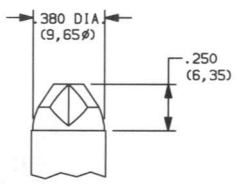












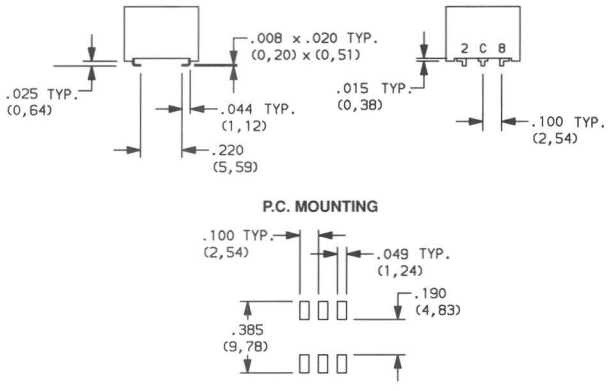
NOTE: Shaft lengths of .150 (3,81) – .400 (10, 16) possible, consult factory.

Sealed* Surface Mount DIP Coded Rotary Switches

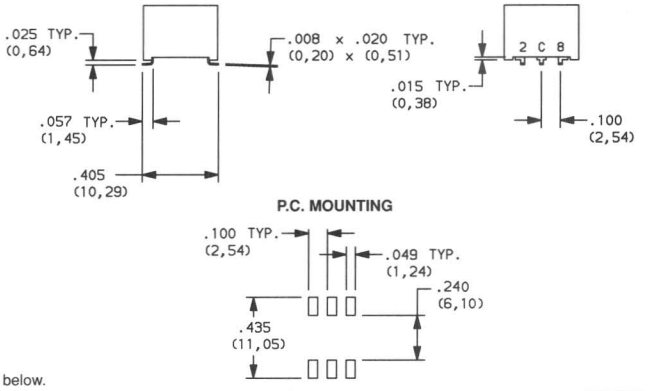
* Process sealed – withstands soldering and cleaning processes.

TERMINATIONS

J



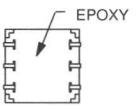
S



See 'CAUTION' below.

SEAL

E



HOW TO ORDER

All available 3D SERIES SEALED SURFACE MOUNT DIP CODED ROTARY SWITCH options are listed on page A-19, and are described on pages A-19 thru A-21. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. Additional 3D Series thru-hole models – see catalog section F, pages F-2 thru F-4.

SPECIFICATIONS

CONTACT RATING: 100 mA max. @5 V DC or 25 mA max. @ 25 V DC.

ELECTRICAL LIFE: 2000 make-and-break cycles at full load, for a total of 64,000 detent operations.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -40°C to 85°C.

SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches supplied in rigid dispensing tubes. Tape and reel packaging per EIA 481A also available, consult factory.

MATERIALS

HOUSING: PEI (UL 94V-0)

BASE: PET (UL 94V-0).

ROTOR & ACTUATOR: PES, with standard internal o-ring seal (UL 94V-0).

SHAFT AND WHEEL: Nylon 6/6, (UL 94V-0).

CONTACTS: Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate. All terminals insert molded.

TERMINAL SEAL: Epoxy.

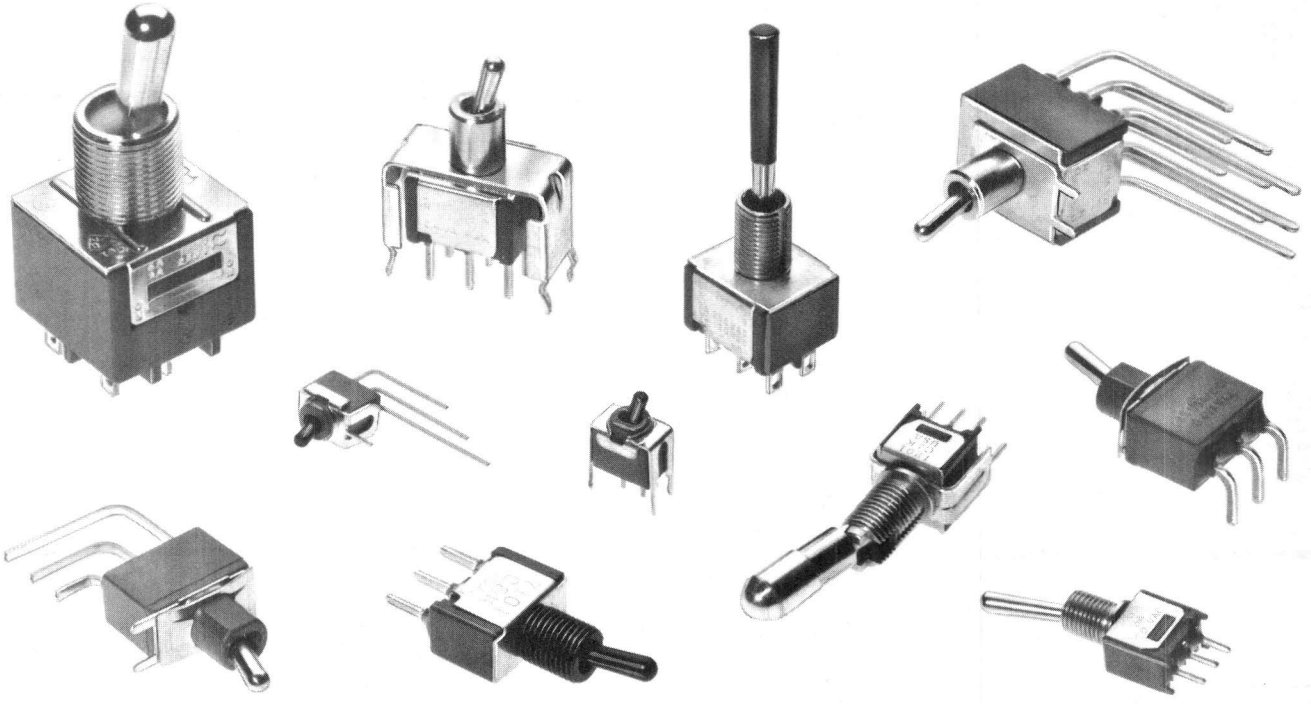
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

CAUTION: PC mounting layouts and pads as shown are designed to be compatible with the latest equipment and reflow techniques. Care should be exercised, however, in the design and location of PC lands to suit individual needs. Orientation relative to reflow direction may significantly impact solder joint integrity.

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SECTION B

TOGGLE SWITCHES



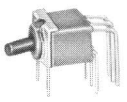
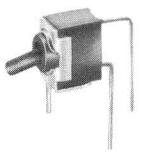
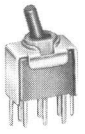
GT Series	Sealed Ultra-Miniature Toggle Switches	B-2 thru B-5
ET Series	Sealed Tiny Toggle Switches	B-6 thru B-11
T Series	Tiny Toggle Switches	B-12 thru B-17
E Series	Sealed Toggle Switches	B-18 thru B-29
7000 Series	Toggle Switches	B-30 thru B-46
9000 Series	Power Toggle Switches	B-47 thru B-52

GT Series

NEW DP Models

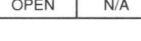
Sealed* Ultra-Miniature Toggle Switches

* Process sealed – withstands soldering and cleaning processes.

B

- **FOUR P.C. TERMINAL STYLES – .100 IN. TERMINAL SPACING.**
- **NEW TWO POLE MODEL – SAME SIZE AS SINGLE POLE SWITCH.**
- **SEALED CONSTRUCTION – INTERNAL ACTUATOR O-RING, EPOXY BASE SEAL.**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**
- **PROCESS COMPATIBLE – WITHSTANDS IR AND VAPOR PHASE REFLOW SOLDERING AND CLEANING PROCESSES – HIGH TEMPERATURE MATERIALS (UL 94V-0).**

PART NO.	SWITCH FUNC. POS. 1	POS. 2	POS. 3
GT01MCKE	ON	NONE	ON
GT03MCKE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic SPDT			
GT02MCKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic SPST			

SP MODELS WITH C TERMINALS

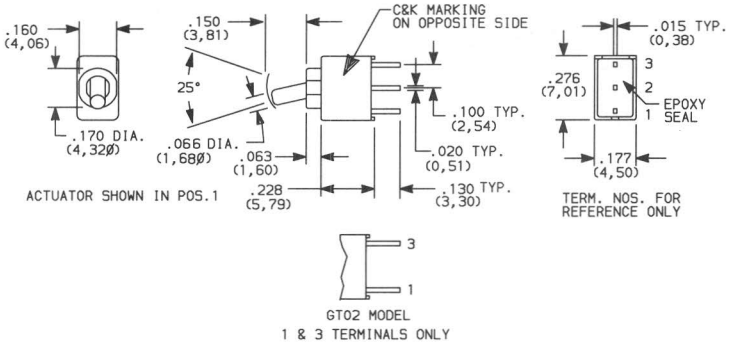


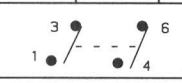
GT01 SPDT



GT02 SPST

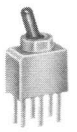
SPST and SPDT



PART NO.	SWITCH FUNC. POS. 1	POS. 2	POS. 3
GT21MCKE	ON	NONE	ON
GT23MCKE	ON	OFF	ON
Conn. Terms.	2-3,5-6	OPEN	2-1,5-4
Schematic DPDT			
GT22MCKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1,6-4
Schematic DPST			

DP MODELS WITH C TERMINALS

NEW

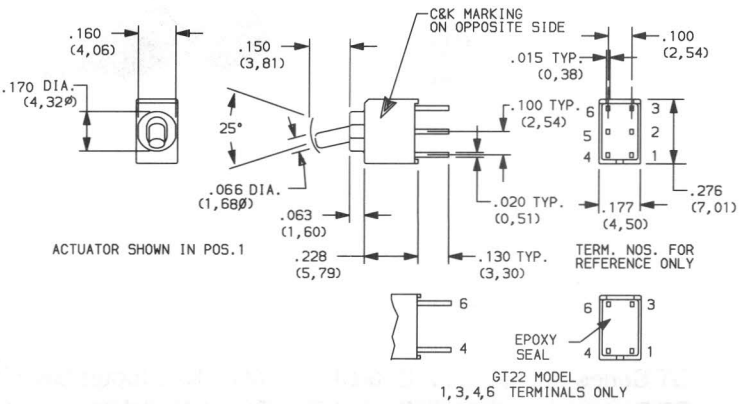


GT21 DPDT



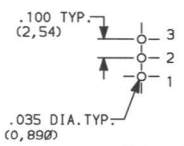
GT22 DPST

DPST and DPDT



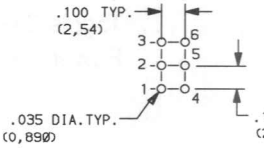
P.C. MOUNTING

GT0X



GT02 - omit center hole 2.

GT2X



GT22 - omit center holes 2 & 5.

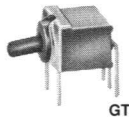
NEW DP Models

Sealed* Ultra-Miniature Toggle Switches

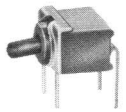
* Process sealed – withstands soldering and cleaning processes.

SP MODELS WITH A TERMINALS

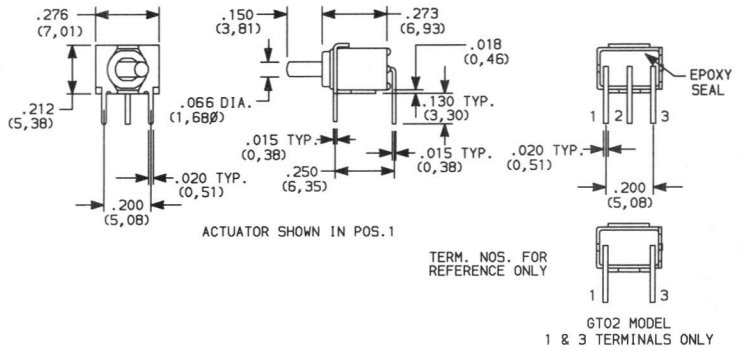
PART NO.	SWITCH FUNC. POS. 1	POS. 2	POS. 3
GT01MAKE	ON	NONE	ON
GT03MAKE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic SPDT		2 (COMM), 1, 3	
GT02MAKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic SPST		1, 3	



GT01
SPDT



GT02
SPST

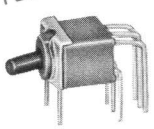


SPST and SPDT

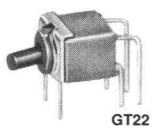
DP MODELS WITH A TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2	POS. 3
GT21MAKE	ON	NONE	ON
GT23MAKE	ON	OFF	ON
Conn. Terms.	2-3,5-6	OPEN	2-1,5-4
Schematic DPDT		2 (COMM), 5, 1, 3, 4, 6	
GT22MAKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1,6-4
Schematic DPST		3, 6, 1, 4	

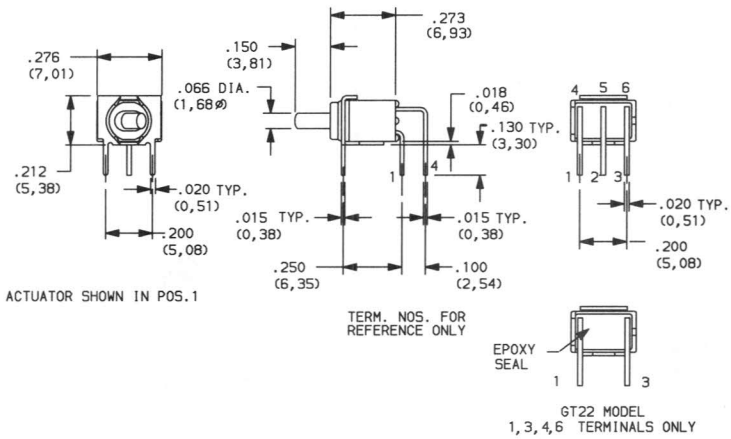
NEW



GT21
DPDT



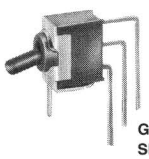
GT22
DPST



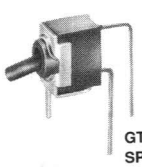
DPST and DPDT

SP MODELS WITH AV TERMINALS

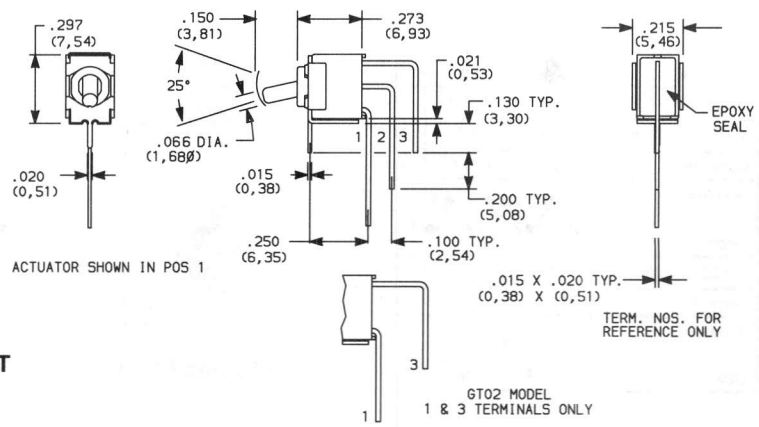
PART NO.	SWITCH FUNC. POS. 1	POS. 2	POS. 3
GT01MAVKE	ON	NONE	ON
GT03MAVKE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic SPDT		2 (COMM), 1, 3	
GT02MAVKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic SPST		1, 3	



GT01
SPDT



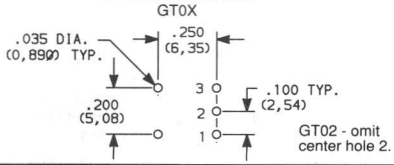
GT02
SPST



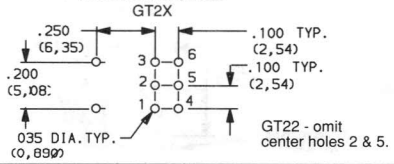
SPST and SPDT

P.C. MOUNTING

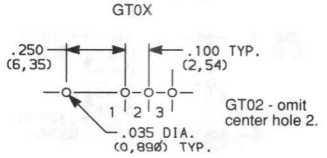
A TERMINAL STYLE
GT0X



A TERMINAL STYLE
GT2X



AV TERMINAL STYLE
GT0X

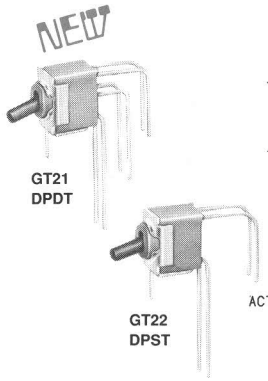


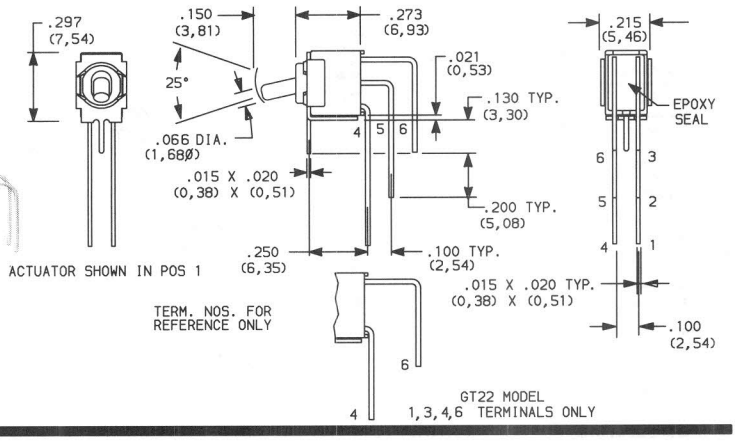
B

DP MODELS WITH AV TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2	POS. 3
GT21MAVKE	ON	NONE	ON
GT23MAVKE	ON	OFF	ON
Conn. Terms.	2-3,5-6	OPEN	2-1,5-4
Schematic DPDT	2 (COMM) 5; 1 3 4 6		
GT22MAVKE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1,6-4
Schematic DPST	3 6; 1 4		

NEW





DPST and DPDT

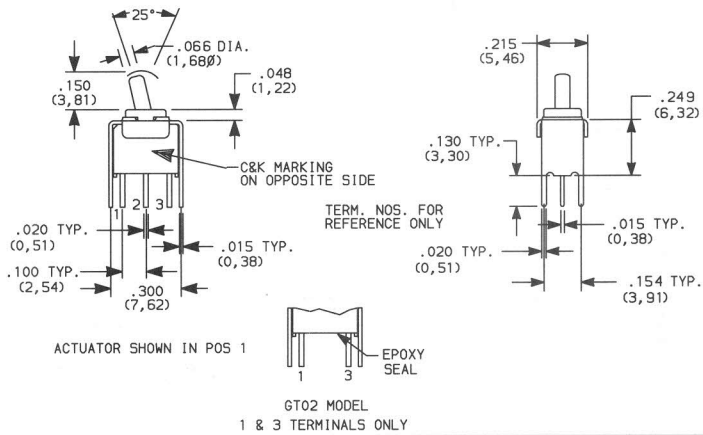
SP MODELS WITH V3 TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2	POS. 3
GT01MV3KE	ON	NONE	ON
GT03MV3KE	ON	OFF	ON
Conn. Terms.	2-3	OPEN	2-1
Schematic SPDT	2 (COMM); 1 3		
GT02MV3KE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1
Schematic SPST	1 3		





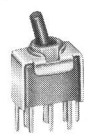
SPST and SPDT



DP MODELS WITH V3 TERMINALS

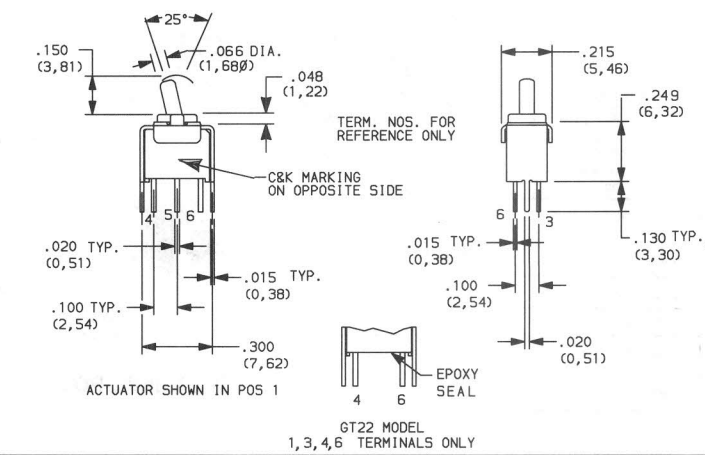
PART NO.	SWITCH FUNC. POS. 1	POS. 2	POS. 3
GT21MV3KE	ON	NONE	ON
GT23MV3KE	ON	OFF	ON
Conn. Terms.	2-3,5-6	OPEN	2-1,5-4
Schematic DPDT	2 (COMM) 5; 1 3 4 6		
GT22MV3KE	OFF	NONE	ON
Conn. Terms.	OPEN	N/A	3-1,6-4
Schematic DPST	3 6; 1 4		

NEW



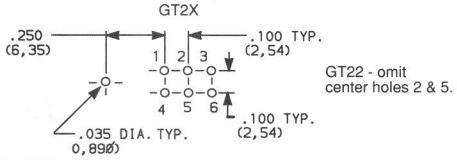


DPST and DPDT



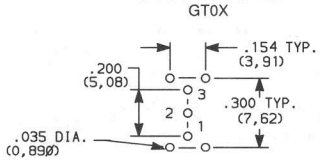
P.C. MOUNTING

AV TERMINAL STYLE
GT2X



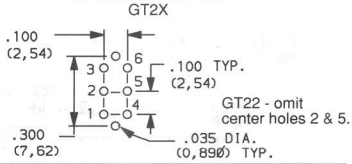
GT22 - omit center holes 2 & 5.

V3 TERMINAL STYLE
GT0X



GT02 - omit center hole 2.

V3 TERMINAL STYLE
GT2X



GT22 - omit center holes 2 & 5.

HOW TO ORDER

Complete part numbers for GT SERIES SEALED ULTRA-MINIATURE TOGGLE SWITCHES are shown on pages B-2 thru B-4.
Additional GT Series surface mount models – see catalog section A, pages A-4 thru A-7.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.

MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30° C to 85° C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

HOUSING & BASE: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0), with standard internal o-ring seal.

SWITCH SUPPORT: Brass, tin plated.

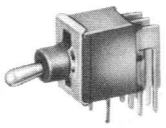
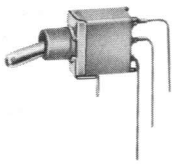
MOVABLE CONTACT: Phosphor bronze with gold plate over nickel plate.

STATIONARY CONTACTS: Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

TERMINAL SEAL: Epoxy. All terminals insert molded.

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

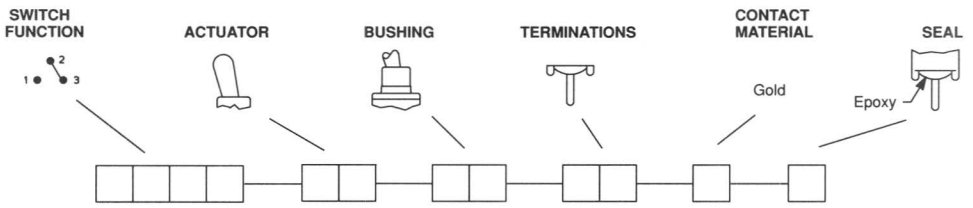





B

UL models available, see page B-7.

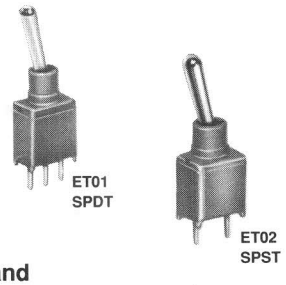
Easy Build-A-Switch:

Below is a complete listing of available options for ET SERIES SEALED TINY TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page B-7; all available options are shown and described on pages B-7 thru B-11. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-11. Hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. Additional ET Series surface mount models – see catalog section A, pages A-14 and A-15.

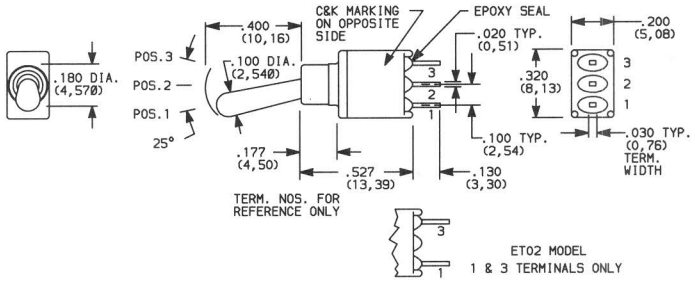


ET01	L	D1	A	B	E
ET02	M		AV	G	
ET03	M3		C	K	
ET05	S		V3	L	
ET07	S1		W	M	
ET08				Q	
ET21					
ET23					
ET24					
ET25					
ET27					
ET28					

SWITCHES WITH STANDARD OPTIONS



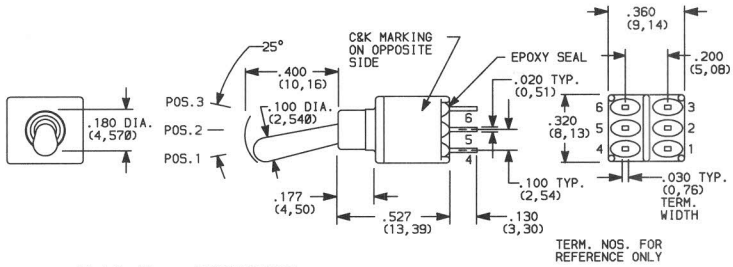
SPST and SPDT



Part No. Shown: ET01SD1CBE



DPDT



Part No. Shown: ET21SD1CBE

SWITCH FUNCTION

NO. POLES	MODEL+ NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	ET01	ON	NONE	ON	2-3	OPEN	2-1	SPDT
	ET03	ON	OFF	ON				
	ET05	MOM.	OFF	MOM.				
	ET07	ON	OFF	MOM.				
	ET08	ON	NONE	MOM.				
	ET02	OFF	NONE	ON	OPEN	N/A	3-1	SPST
DP	ET21	ON	NONE	ON	2-3,5-6	OPEN	2-1,5-4	DPDT
	ET23	ON	OFF	ON				
	ET25	MOM.	OFF	MOM.				
	ET27	ON	OFF	MOM.				
	ET28	ON	NONE	MOM.				
	ET24**	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	

MOM. = MOMENTARY

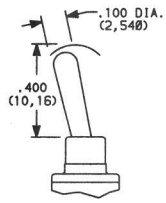
+ All models UL with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

** Wiring for 3-way switch, see page X.

B

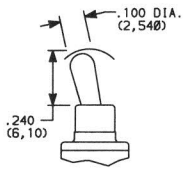
ACTUATOR

S



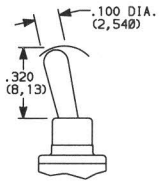
Std. with C or W terminations.

M

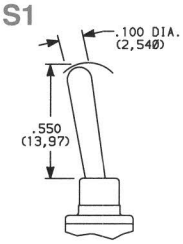


Std. with A, AV, V3 terminations.

L

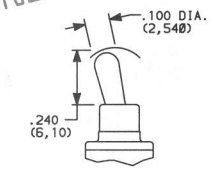


S1



M3 PLASTIC – ANTISTATIC

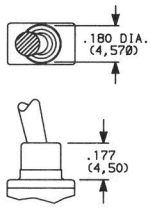
NEW



Material: PES (UL 94V-0), black. Static resistance: 9,000 V DC min @ sea level, actuator to terminals.

BUSHING

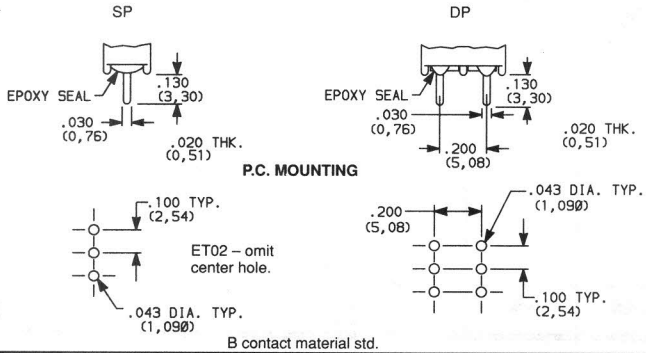
D1 (STD.)



Internal actuator o-ring seal std.

TERMINATIONS

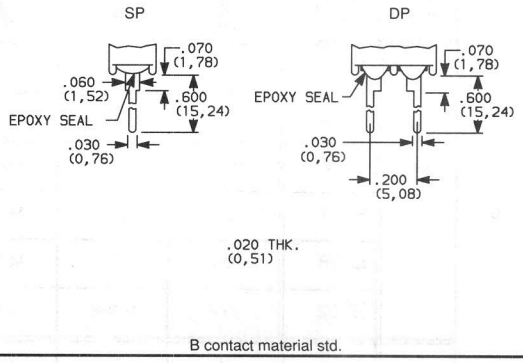
C (STD.)



SP and DP

B contact material std.

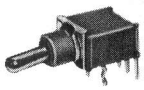
W WIRE WRAP



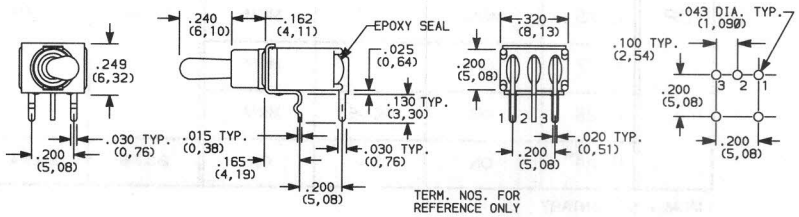
SP and DP

B contact material std.

A



SPDT



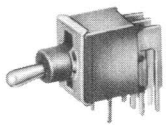
Actuator shown in pos.1.
B contact material std.
Not avail. with ET02 model.

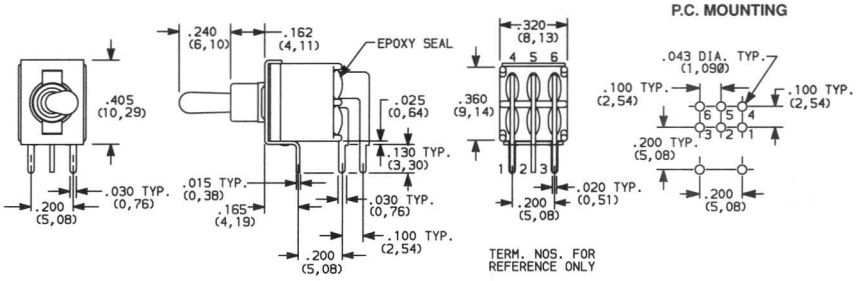
Part No. Shown: ET01MD1ABE

B

TERMINATIONS

A



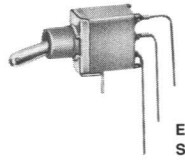


DPDT

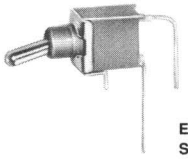
Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET21MD1ABE

AV

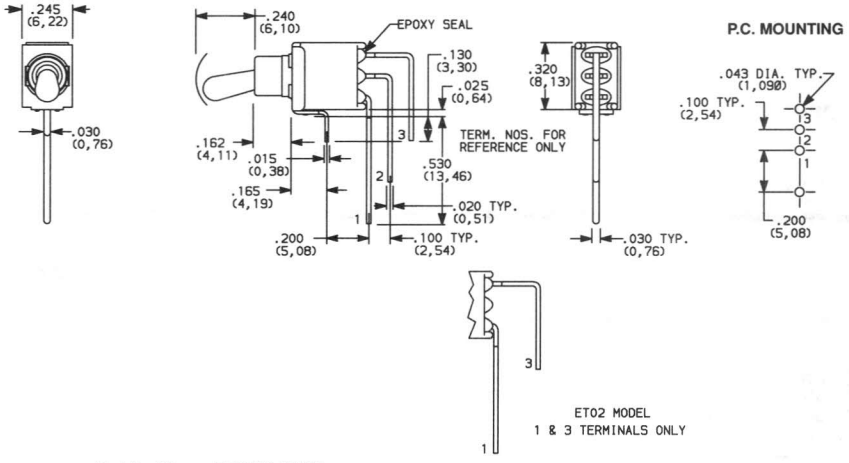


ET01
SPDT



SPST and SPDT

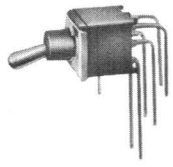
ET02
SPST



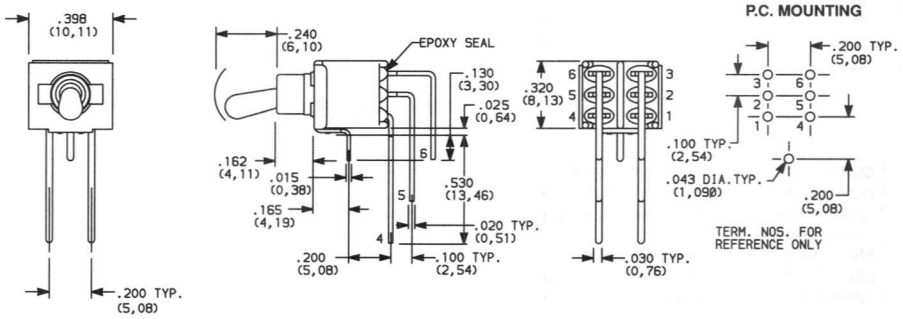
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET01MD1AVBE

AV



DPDT



Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET21MD1AVBE

B

TERMINATIONS

V3

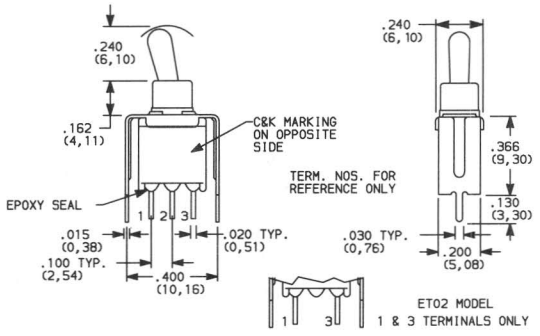


ET01
SPDT

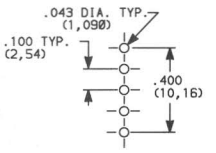


SPST and SPDT

ET02
SPST



P.C. MOUNTING



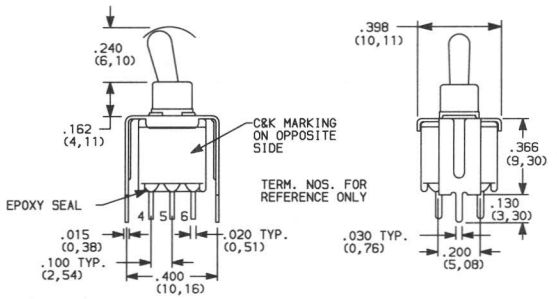
Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET01MD1V3BE

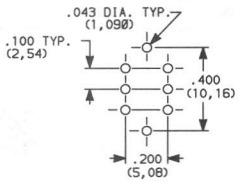
V3



DPDT



P.C. MOUNTING



Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET21MD1V3BE

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	ETX1 MODELS: 3 AMPS @120 V AC OR 28 V DC.
M		TIN-LEAD [6]		ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	ETX1 MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 3 AMPS @120 V AC OR 28 V DC.
L		TIN-LEAD [6]		ALL OTHER MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 2 AMPS @ 120 V AC OR 28 V DC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

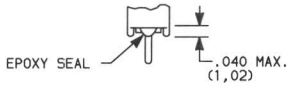
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models with all options when ordered with G, L, M or Q contact material.
See pages B-7 and VIII.

B contact material std. with all terminations.

SEAL

E (STD.)



HOW TO ORDER

All available ET SERIES SEALED TINY TOGGLE SWITCH options are listed on page B-6, and are described on pages B-7 thru B-11. Switches with standard options are shown on page B-7. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. VU models available, see page B-7. Additional ET Series surface mount models – see catalog section A, pages A-14 and A-15.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max. (B contact mat'l).

ELECTRICAL LIFE: ETX1 MODELS: 60,000 make-and-break cycles at full load. All other models, 30,000 cycles.

CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

STATIC RESISTANCE (M3 actuator only): 9,000 V DC min. @ sea level, actuator to terminals.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

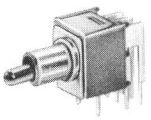
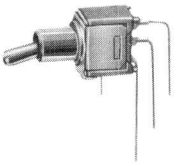
ACTUATOR: M3 antistatic actuator – PES (UL 94V-0), black. All other actuators – brass, chrome plated. Internal o-ring seal standard with all actuators.

SWITCH SUPPORT: Brass, tin plated.

CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact mat'l).

TERMINAL SEAL: Epoxy.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

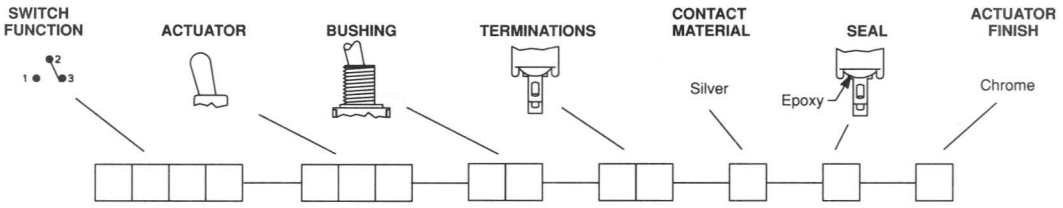





B

models available, see page B-13.

Easy Build-A-Switch:

Below is a complete listing of available options for T SERIES TINY TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page B-13; all available options are shown and described on pages B-13 thru B-17. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-17. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.



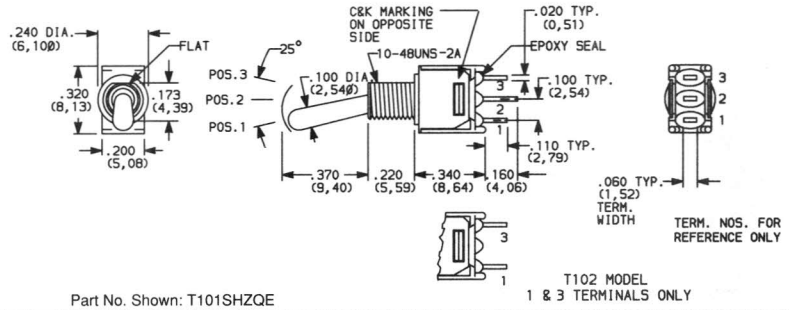
T101	K	CF	A	B	E	(NONE)
T102	K1	D9	AV	G		2
T103	L	H	C	K		3
T105	L1	H9	V3	L		7
T107	M	K9	W	M		
T108	M1	T	Z	Q		
T201	P3	T9				
T203	S	TD				
T205	S1	TK				
T207		Y				
T208		Y9				
T211						

SWITCHES WITH STANDARD OPTIONS





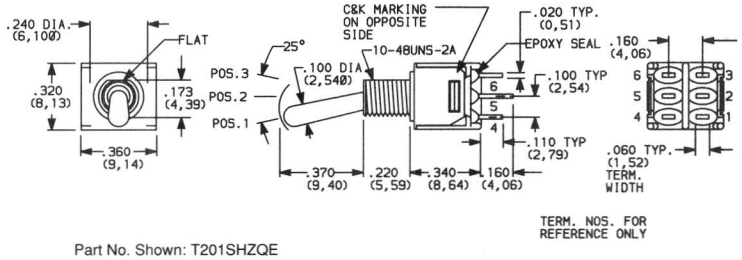
SPST and SPDT



Part No. Shown: T101SHZQE



DPDT



Part No. Shown: T201SHZQE

SWITCH FUNCTION

NO. POLES	MODEL* NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	T101	ON	NONE	ON	2-3	OPEN	2-1	SPDT
	T103	ON	OFF	ON				
	T105	MOM.	OFF	MOM.				
	T107	ON	OFF	MOM.				
	T108	ON	NONE	MOM.				
	T102	OFF	NONE	ON	OPEN	N/A	3-1	SPST
DP	T201	ON	NONE	ON	2-3,5-6	OPEN	2-1,5-4	DPDT
	T203	ON	OFF	ON				
	T205	MOM.	OFF	MOM.				
	T207	ON	OFF	MOM.				
	T208	ON	NONE	MOM.				
	T211**	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	

MOM. = MOMENTARY

* All models UL with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

** Wiring for 3-way switch, see page X.

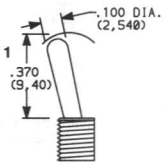
B

ACTUATOR

ACTUATOR ACTUATOR FINISH

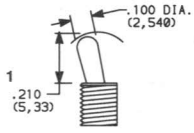
All actuators except KXX: finish, chrome; no finish selection required.

S



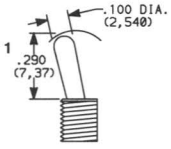
Std. with Z, C or W terminations.

M

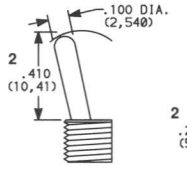


Std. with A, AV or V3 terminations.

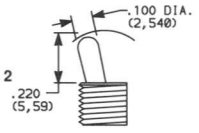
L



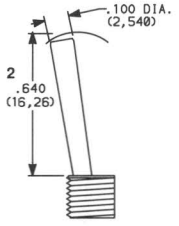
S1



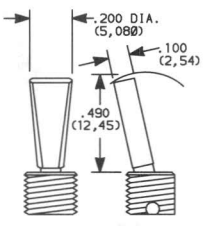
M1



L1



P3 ANTIROTATION

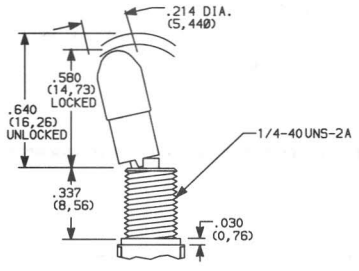


Avail. with T, T9 bushings only. Dress nut P/N 709901201 supplied std. with threaded bushing.

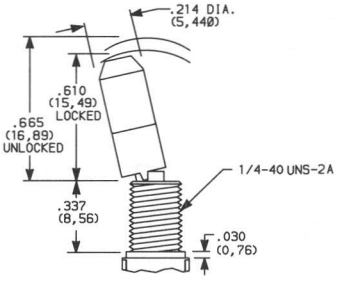
[1] Actuators shown with std. H bushing. Subtract .040 (1,02) for TD and D9 bushings, subtract .090 (2,29) for T, T9, TK, K9, CF bushings.

[2] Actuators shown with T, TK, CF bushings. Add .050 (1,27) for TD and D9 bushings add .090 (2,29) for H, H9, Y, Y9 bushings.

K LOCKING LEVER



K1 LOCKING LEVER



Keyway on right side.
Bushing option code not required. Not avail. with TX05, TX07 models.

ACTUATOR CAP FINISH

KXX actuators only.

OPTION CODE	ACTUATOR FINISH
NONE (std.)	Natural AL. (std.)
2	Black Anodized AL.
3	Red Anodized AL.
7	Blue Anodized AL.

Select actuator cap finish from chart. Place option code (if required) in appropriate box of ordering format.

To prevent accidental actuation, toggles must be lifted before being actuated. When released, toggles again lock in place.

Please note: Overtightening mounting nut may cause actuator to bind.

K, K1 Locking Positions



-01,-02 Models 2 Pos. Lock

-03,-11 Models 3 Pos. Lock

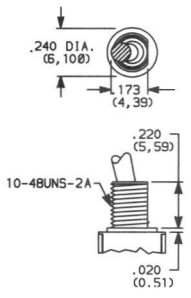
-08 Models 1 Pos. Lock

Keyway on right side.

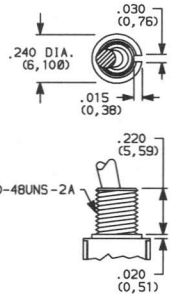
BUSHING

Hardware is supplied where applicable, see HOW TO ORDER, page B-17.

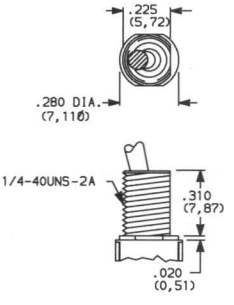
H
H9 UNTHREADED



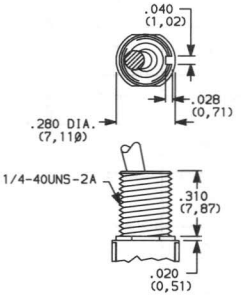
Y
Y9 UNTHREADED



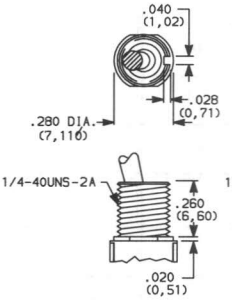
T
T9 UNTHREADED



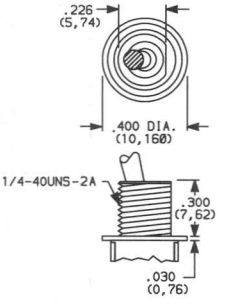
TK
K9 UNTHREADED



TD
D9 UNTHREADED



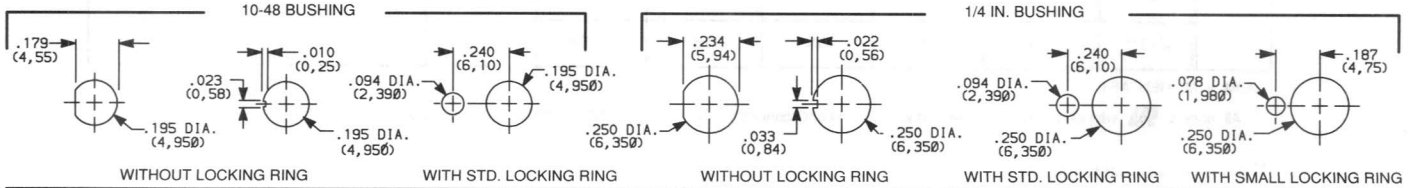
CF SPLASHPROOF



H std. with Z, C, W terminations.
H9 std. with A, AV, V3 terminations.

Internal o-ring actuator seal and external bushing seal washer std.

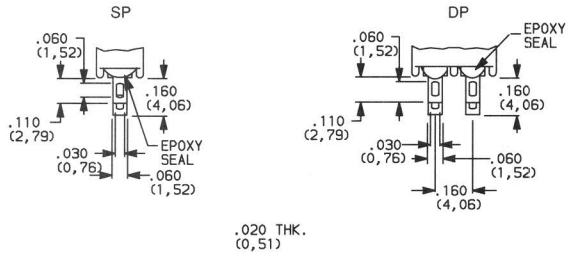
PANEL MOUNTING



WITHOUT LOCKING RING | WITH STD. LOCKING RING | WITHOUT LOCKING RING | WITH STD. LOCKING RING | WITH SMALL LOCKING RING

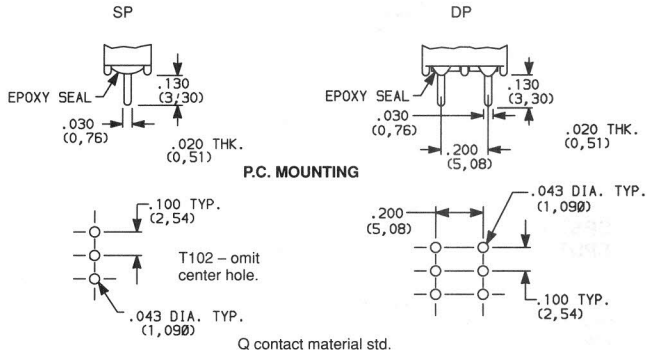
TERMINATIONS

Z (STD.)



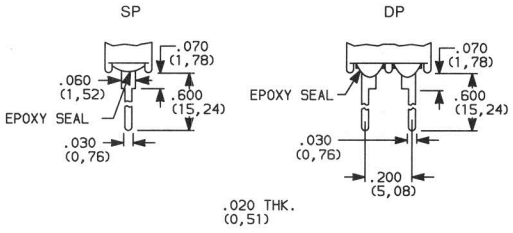
Q contact material std.
Not avail. with K, L, or M contact material.

C



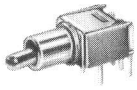
Q contact material std.

W WIRE WRAP

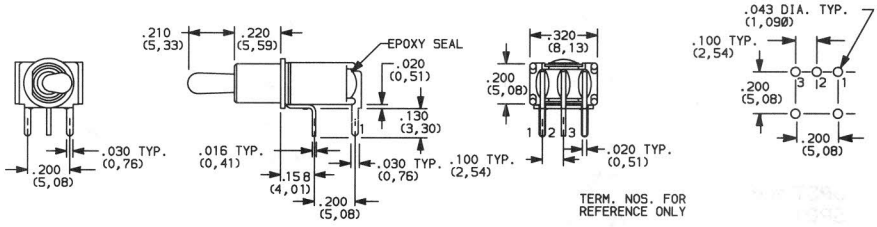


B contact material std.

A



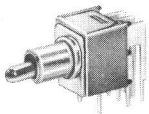
SPDT



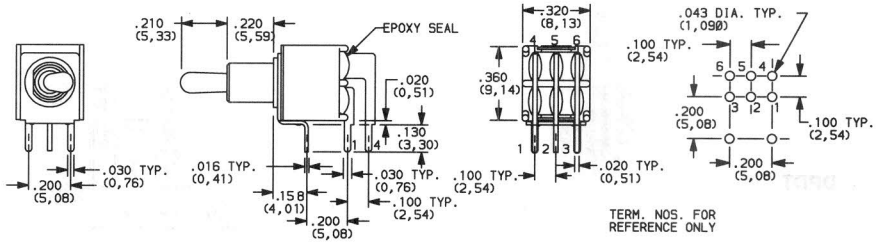
Actuator shown in pos.1.
B contact material std.
Not avail. with T102 model.

Part No. Shown: T101MH9ABE

A



DPDT



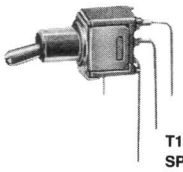
Actuator shown in pos.1.
B contact material std.

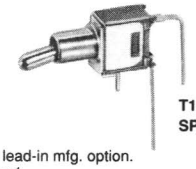
Part No. Shown: T201MH9ABE

B

TERMINATIONS

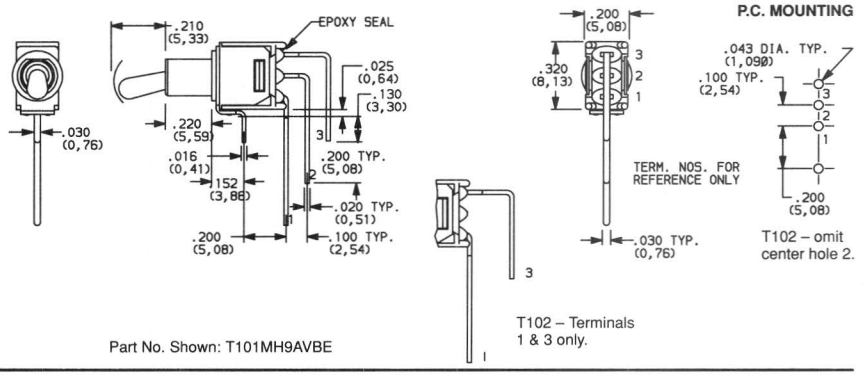
AV





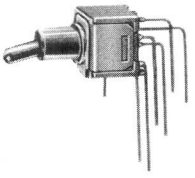
SPST and SPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.



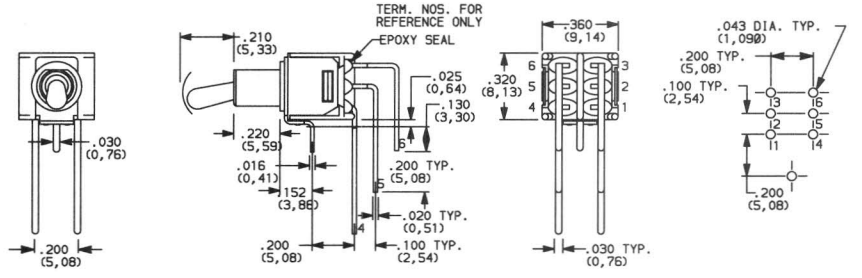
Part No. Shown: T101MH9AVBE

AV



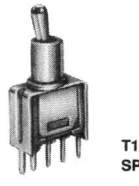
DPDT

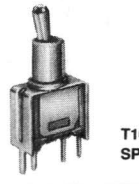
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.



Part No. Shown: T201MH9AVBE

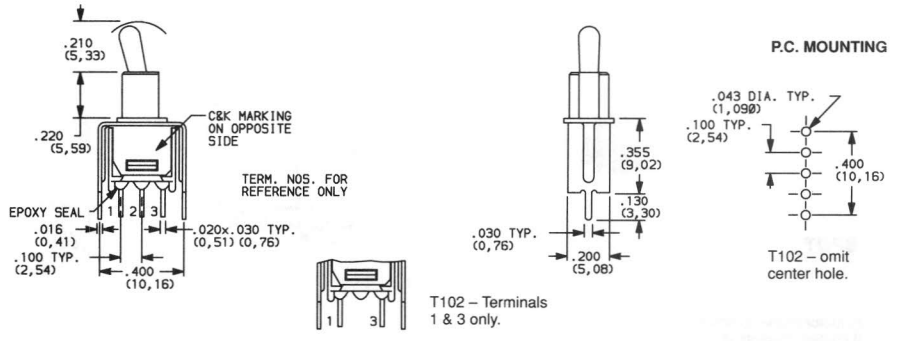
V3





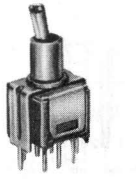
SPST and SPDT

Actuator shown in pos.1.
B contact material std.



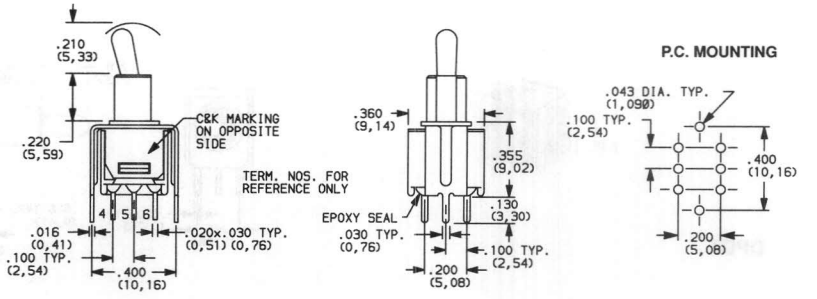
Part No. Shown: T101MH9V3BE

V3



DPDT

Actuator shown in pos.1.
B contact material std.



Part No. Shown: T201MH9V3BE

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	TX01 MODELS: 3 AMPS @120 V AC OR 28 V DC.
M		TIN-LEAD [6]		ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	TX01 MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 3 AMPS @120 V AC OR 28 V DC
L		TIN-LEAD [6]		ALL OTHER MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 2 AMPS @ 120 V AC OR 28 V DC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

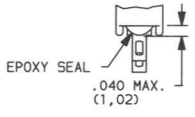
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

B contact material std. with A, AV, V3, W terminations.
Q contact material std. with Z, C terminations.

All models UL with all options when ordered with G, L, M or Q contact material.
See pages B-13 and VIII.

SEAL

E (STD.)



HOW TO ORDER

All available T SERIES TINY TOGGLE SWITCH options are listed on page B-12, and are described on pages B-13 thru B-17. Switches with standard options are shown on page B-13. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. UL models available, see page B-13. Hardware: one mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings). Optional mounting nut and locking ring styles and finishes available. Hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING: TX01 MODELS: 3 AMPS @ 120 V AC or 28 V DC.
ALL OTHER MODELS: 2 AMPS @ 120 V AC or 28 V DC
(Q contact material).

ELECTRICAL LIFE: TX01 models: 60,000 make-and-break cycles at full load.
ALL OTHER MODELS: 30,000 cycles.

CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

CASE: Glass filled nylon 6/6, flame retardant, heat stabilized or diallyl phthalate (DAP), (UL 94V-0).

ACTUATOR: Brass, chrome plated.

BUSHING: Brass, nickel plated.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass, tin plated.

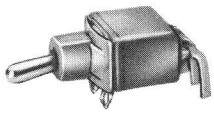
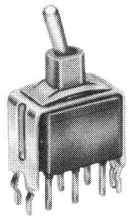
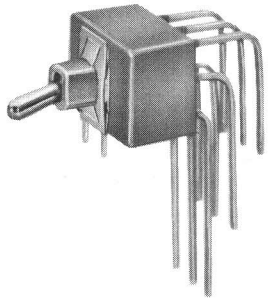
END CONTACTS: Coin silver, silver plated (Q contact mat'l).

CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l).

TERMINAL SEAL: Epoxy.

HARDWARE: Nut & Locking ring – Brass, nickel plated.
Lockwasher – Steel, nickel plated.

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

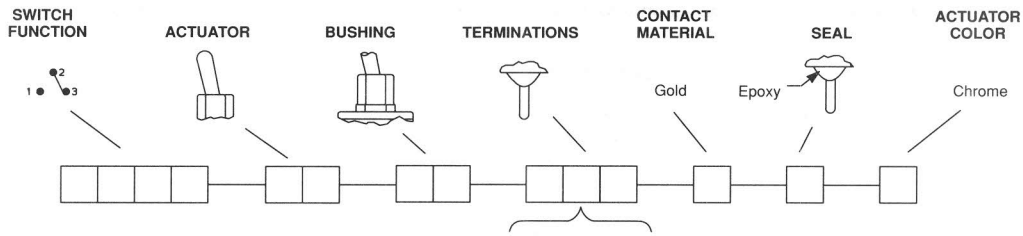





models available, see page B-20.

B

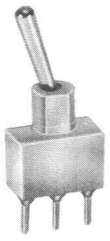
Easy Build-A-Switch:

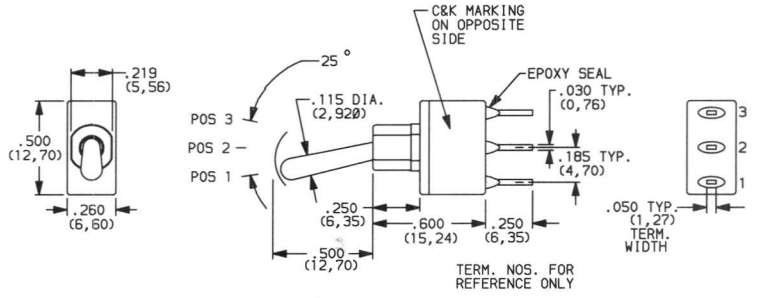
Below is a complete listing of available options for E SERIES SEALED TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page B-19; all available options are shown and described on pages B-20 thru B-29. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-29. Hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.



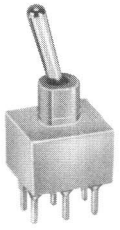
SWITCH FUNCTION	ACTUATOR	BUSHING	TERMINATIONS		CONTACT MATERIAL	SEAL	ACTUATOR COLOR
E101	L3	D1	A	V61	B	E	(NONE)
E103	M	D9	A3	V71	G		1
E105	S	Y	AV1	V81	K		2
E107			AV2	V91	L		3
E108			AV3	W	M		4
E201			AV4	W1	Q		5
E203			AV5	W3			6
E205			AW	W4			7
E207			AW1	W5			8
E208			AW3	Z			9
E211			AW4	Z3			
E213			AW5				
E215			C				
E301			R				
E303			R2				
E305			V2				
E307			V3				
E308			V4				
			V6				
			V7				
			V8				
			V9				
			V21				
			V31				
			V41				

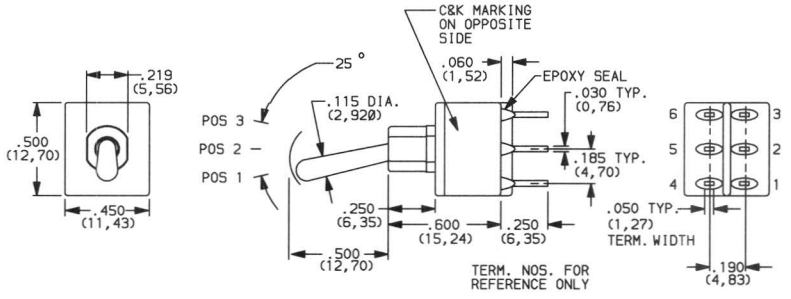
SWITCHES WITH STANDARD OPTIONS



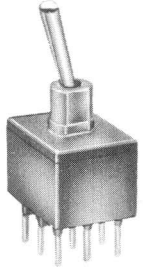


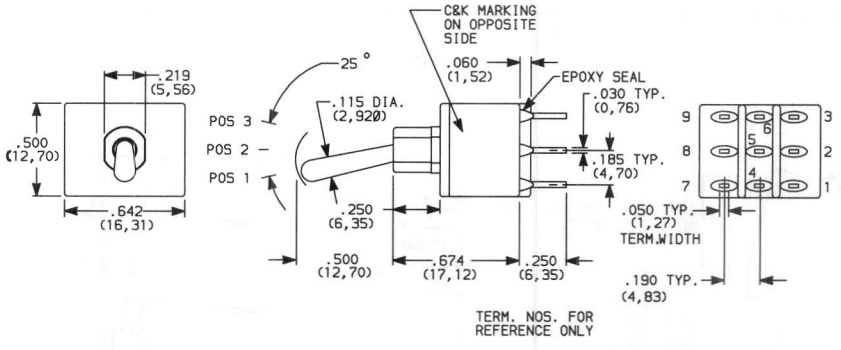
SPDT Part No. Shown: E101SD1CBE





DPDT Part No. Shown: E201SD1CBE

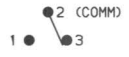
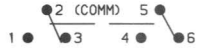
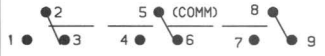




3PDT Part No. Shown: E301SD1CBE

B

SWITCH FUNCTION

NO. POLES	MODEL+ NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	E101	ON	NONE	ON	2-3	OPEN	2-1	 SPDT
	E103	ON	OFF	ON				
	E105	MOM.	OFF	MOM.				
	E107	ON	OFF	MOM.				
	E108	ON	NONE	MOM.				
DP	E201	ON	NONE	ON	2-3,5-6	OPEN	2-1,5-4	 DPDT
	E203	ON	OFF	ON				
	E205	MOM.	OFF	MOM.				
	E207	ON	OFF	MOM.				
	E208	ON	NONE	MOM.				
	E211**	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	
	E213**	ON	ON	MOM.				
	E215**	MOM.	ON	MOM.				
3P	E301	ON	NONE	ON	2-3,5-6,8-9	OPEN	2-1,5-4,8-7	 3PDT
	E303	ON	OFF	ON				
	E305	MOM.	OFF	MOM.				
	E307	ON	OFF	MOM.				
	E308	ON	NONE	MOM.				

MOM. = MOMENTARY

E3XX models not avail. with D9 bushing.

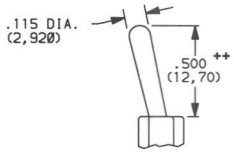
+ All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

** Wiring for 3-way switch, see page X.

ACTUATOR

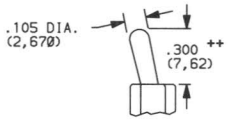
ACTUATOR ACTUATOR COLOR

S



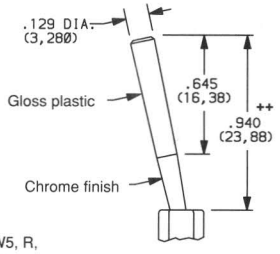
Std. when ordered with Z, C, Z3, W-W5 terminations. Finish: Chrome.

M



Std. when ordered with A, A3, AW-AW5, R, R2, AV1-AV5, V2-V91 terminations. Finish: Chrome.

L3 PLASTIC



ACTUATOR COLOR

L3 Actuator only.

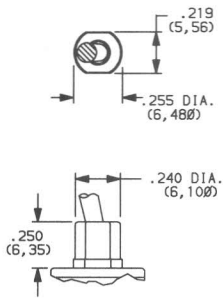
OPTION CODE	ACTUATOR COLOR	OPTION CODE	ACTUATOR COLOR
1	WHITE	6	GREEN
2	BLACK (std.)	7	BLUE
3	RED	8	BROWN
4	ORANGE	9	GRAY
5	YELLOW		

Select L3 actuator color from chart. Place option code in appropriate box of ordering format. No color choice required for S, M actuators.

++ Actuators shown with std. D1 bushing. Subtract .030 (0,76) for D9 bushing. Subtract .100 (2,54) for Y bushing.

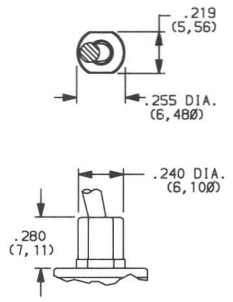
BUSHING

D1 (STD.)



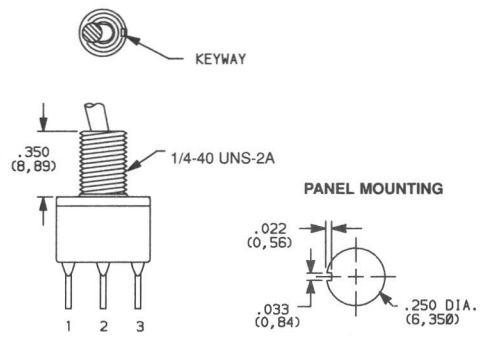
D9

NEW



E3XX models not avail. with D9 bushing.

Y

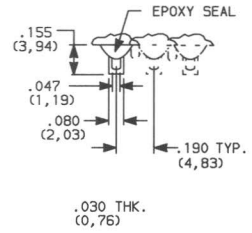


Available only with Z, C, Z3, W-W5 terminations. Hardware: One dress nut P/N 780701201, one hex nut and lockwasher supplied standard.

Internal o-ring actuator seal std. for all bushing options.

TERMINATIONS

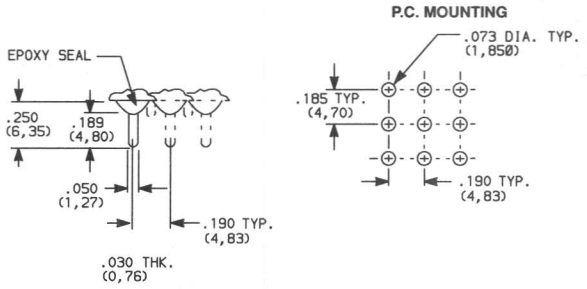
Z (STD.)



SPDT thru **3PDT**

B contact material std.
Not avail. with K, L, or M contact material.

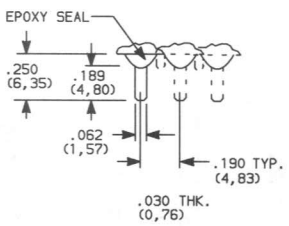
C



SPDT thru **3PDT**

B contact material std.

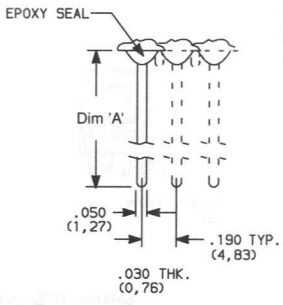
Z3 QUICK CONNECT



SPDT thru **3PDT**

B contact material std.
Mating quick connector available; order part no. 530100000.

W-W1-W3-W4-W5 WIRE WRAP



Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

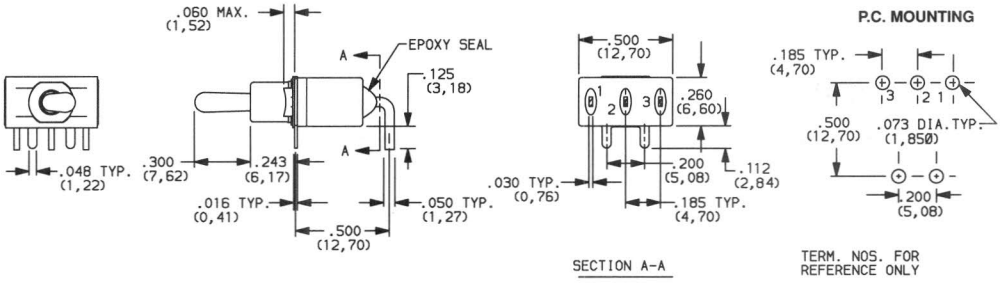
SPDT thru **3PDT**

B contact material std.

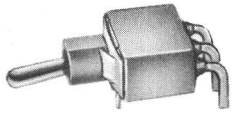
B

TERMINATIONS

A



Part No. Shown: E101MD1ABE

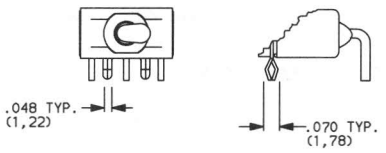


A

SPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with Y bushing.

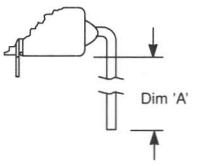
A3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

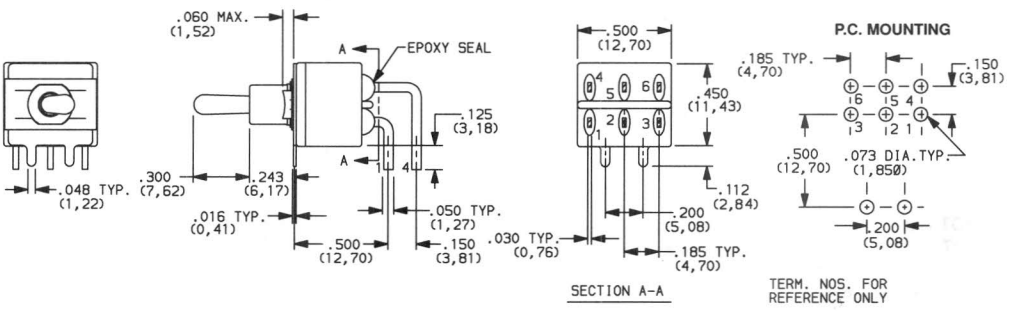
AW-AW1-AW3-AW4-AW5 EXTENDED

NEW

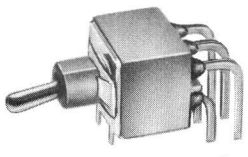


Option	Dim 'A'
AW	.50 (12,7)
AW1	.72 (18,3)
AW3	.20 (5,1)
AW4	.83 (21,1)
AW5	1.08 (27,4)

A



Part No. Shown: E201MD1ABE

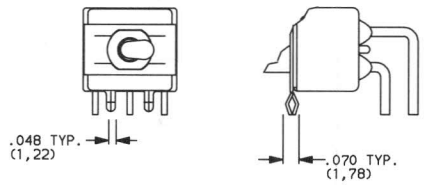


A

DPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with Y bushing.

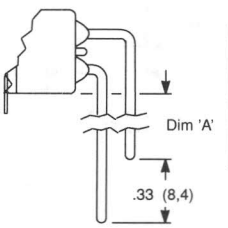
A3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

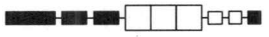
AW-AW1-AW4-AW5 EXTENDED

NEW

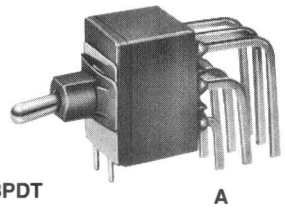


Option	Dim 'A'
AW	.21 (5,3)
AW1	.42 (10,7)
AW4	.52 (13,2)
AW5	.76 (19,3)

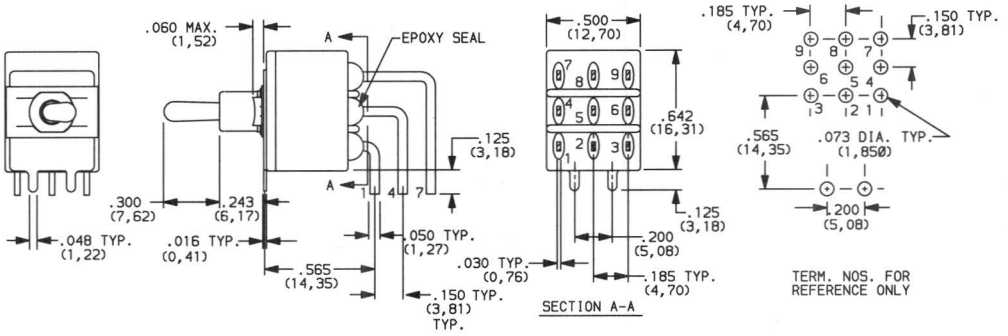
TERMINATIONS



A



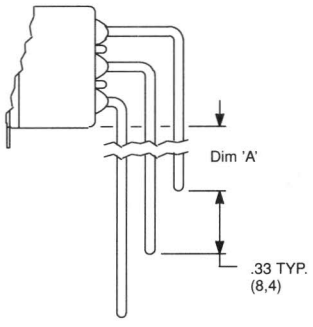
3PDT A



Part No. Shown: E301MD1ABE

AW4-AW5 EXTENDED

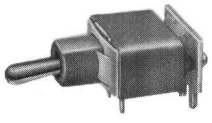
NEW



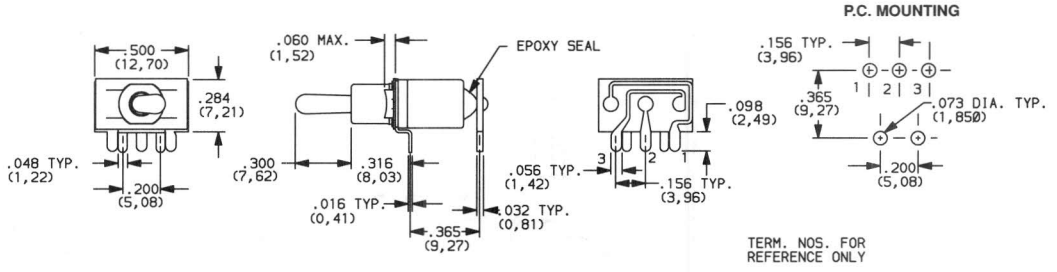
Option	Dim 'A'
AW4	.18 (4,6)
AW5	.42 (10,7)

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Available with D1 bushing only.

R



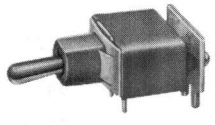
SPDT



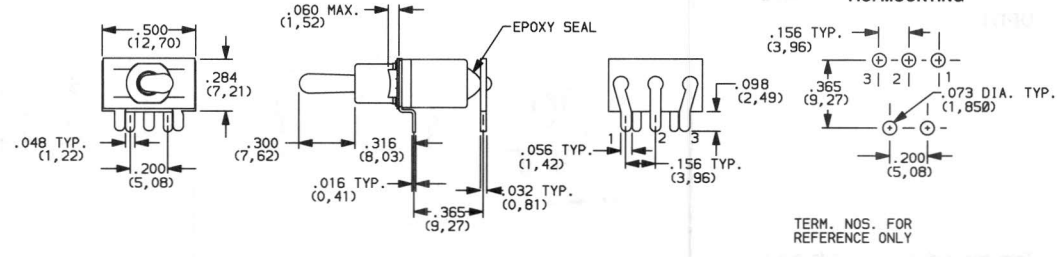
Contact makes on same side act. thrown.
Actuator shown in pos.1.
Available with B contact material only.
Not available with Y bushing.

Part No. Shown: E101MD1RBE

R2



SPDT

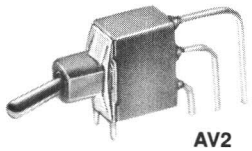


Contact makes on opposite side act. thrown.
Actuator shown in pos.1.
Available with B contact material only.
Not available with Y bushing.

Part No. Shown: E101MD1R2BE

B

TERMINATIONS

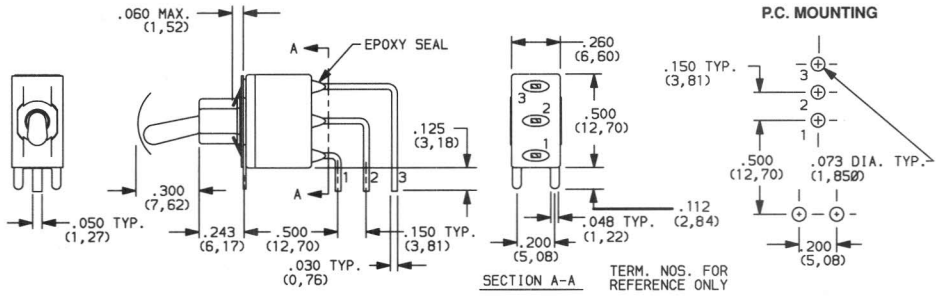


AV2

SPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with Y bushing.

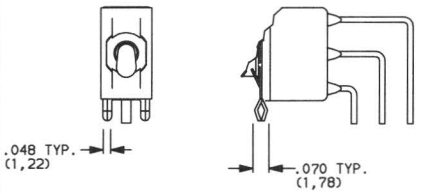
AV2



Part No. Shown: E101MD1AV2BE

AV3 SNAP-IN

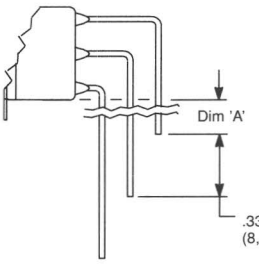
NEW



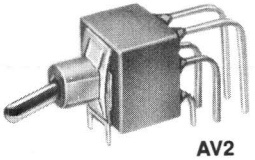
SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED

NEW



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.25 (6,4)
AV5	.49 (12,4)

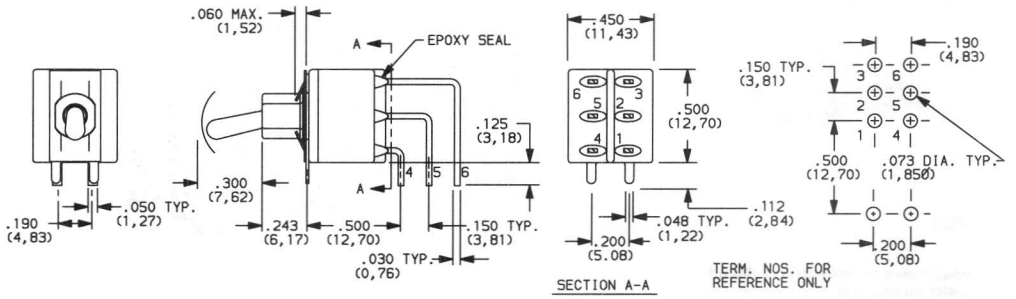


AV2

DPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with Y bushing.

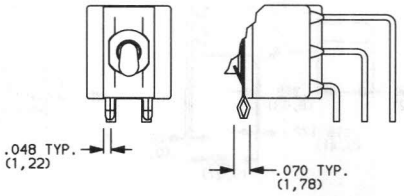
AV2



Part No. Shown: E201MD1AV2BE

AV3 SNAP-IN

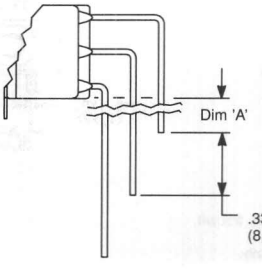
NEW



SNAP-IN DESIGN RETAINS SWITCH.

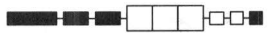
AV1-AV4-AV5 EXTENDED

NEW

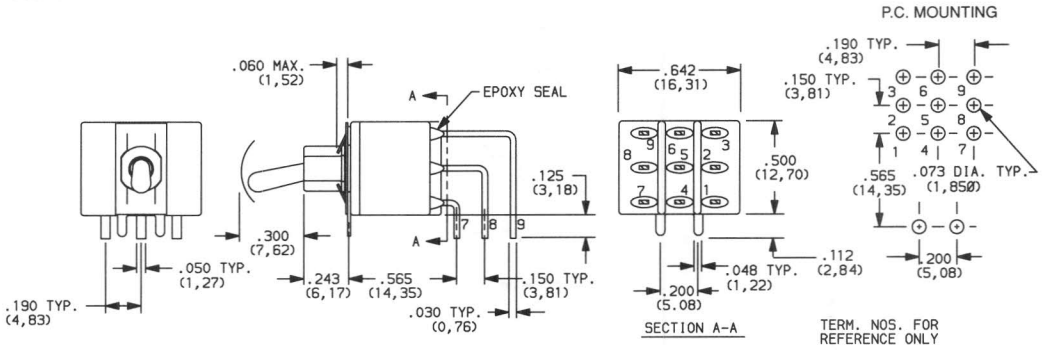


Option	Dim 'A'
AV1	.15 (3,8)
AV4	.25 (6,4)
AV5	.49 (12,4)

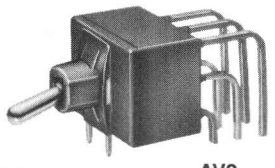
TERMINATIONS



AV2



Part No. Shown: E301MD1AV2BE

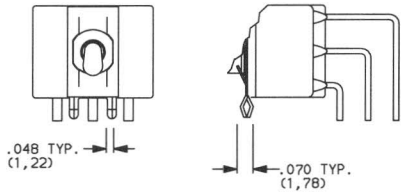


3PDT AV2

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Available with D1 bushing only.

A3 SNAP-IN

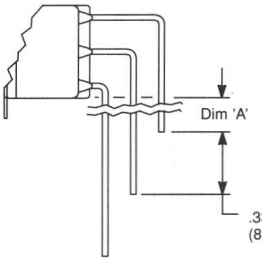
NEW



SNAP-IN DESIGN RETAINS SWITCH.

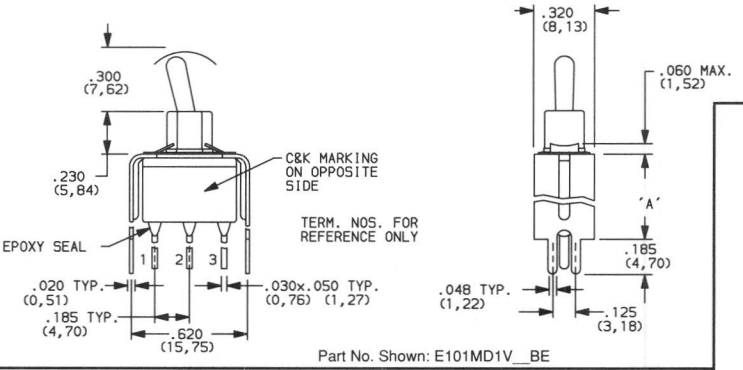
AV1-AV4-AV5 EXTENDED

NEW



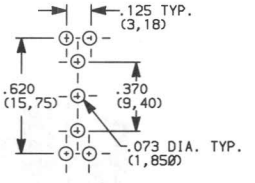
Option	Dim 'A'
AV1	.15 (3,8)
AV4	.25 (6,4)
AV5	.49 (12,4)

V3-V4-V9 REPLACES V30-V40-V90

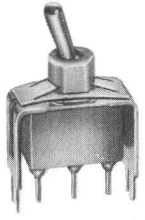


Part No. Shown: E101MD1V__BE

P.C. MOUNTING



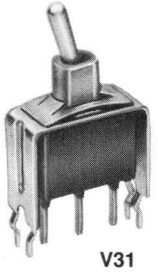
Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)



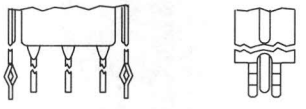
SPDT V3

V31-V41-V91 SNAP-IN

NEW



V31



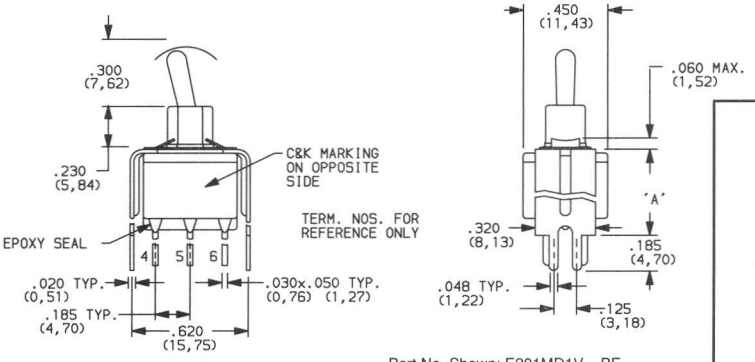
SNAP-IN DESIGN RETAINS SWITCH.

Actuator shown in pos.1.
B contact material std.
Not available with Y bushing.

B

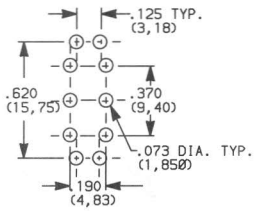
TERMINATIONS

V3-V4-V9 REPLACES V30-V40-V90

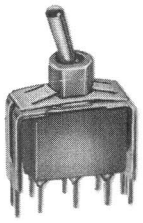


Part No. Shown: E201MD1V__BE

P.C. MOUNTING



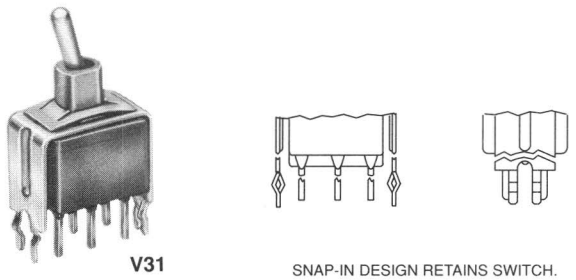
Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)



DPDT V3

V31-V41-V91 SNAP-IN

NEW



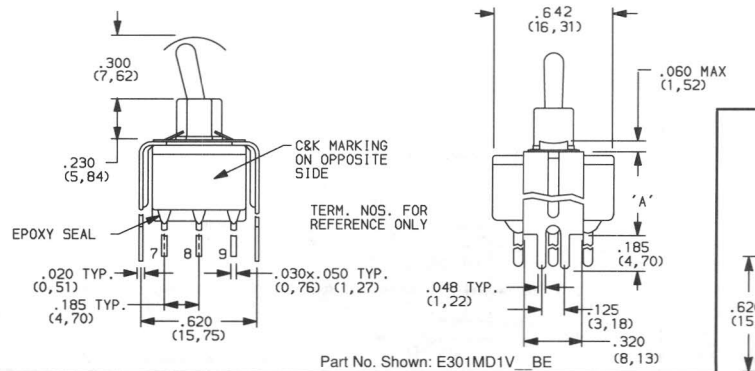
V31

SNAP-IN DESIGN RETAINS SWITCH.

Actuator shown in pos.1.
B contact material std.
Not available with Y bushing.

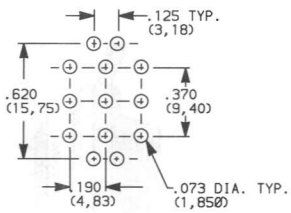
NEW

V4-V9 REPLACES V40-V90

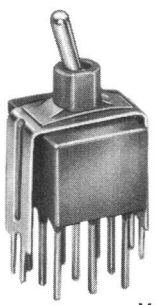


Part No. Shown: E301MD1V__BE

P.C. MOUNTING

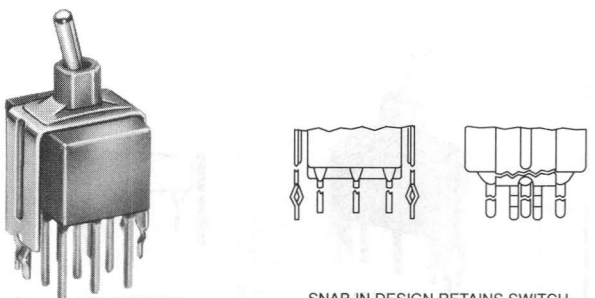


Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)



3PDT V4

V41-V91 SNAP-IN



V41

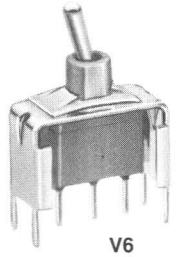
SNAP-IN DESIGN RETAINS SWITCH.

Actuator shown in pos.1.
B contact material std.
Available with D1 bushing only.

B

TERMINATIONS

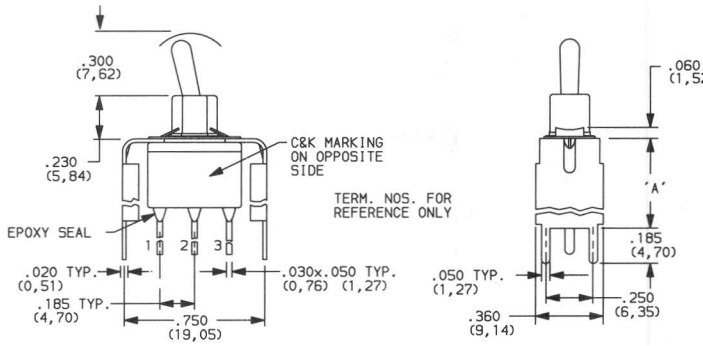
SPDT



V6

Actuator shown in pos.1.
B contact material std.
Not available with Y bushing.

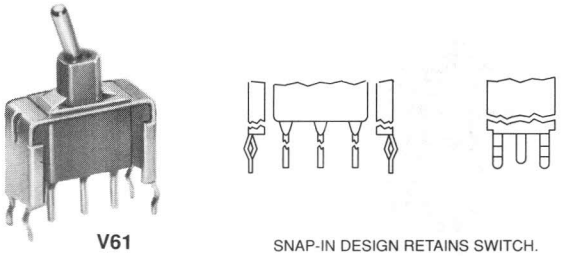
V2-V6-V7-V8 REPLACES V20-V60-V70-V80



Part No. Shown: E01MD1V__BE

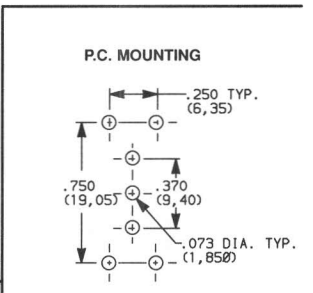
V21-V61-V71-V81 SNAP-IN

NEW



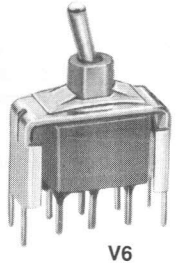
V61

SNAP-IN DESIGN RETAINS SWITCH.



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

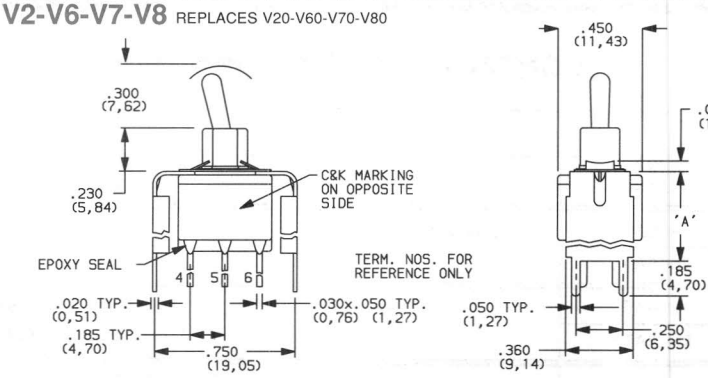
DPDT



V6

Actuator shown in pos.1.
B contact material std.
Not available with Y bushing.

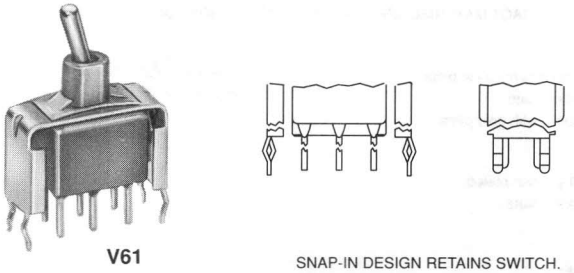
V2-V6-V7-V8 REPLACES V20-V60-V70-V80



Part No. Shown: E201MD1V__BE

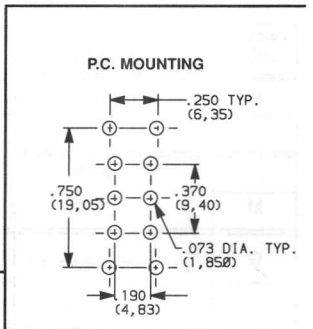
V21-V61-V71-V81 SNAP-IN

NEW



V61

SNAP-IN DESIGN RETAINS SWITCH.



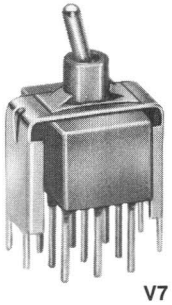
Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

B

TERMINATIONS

NEW

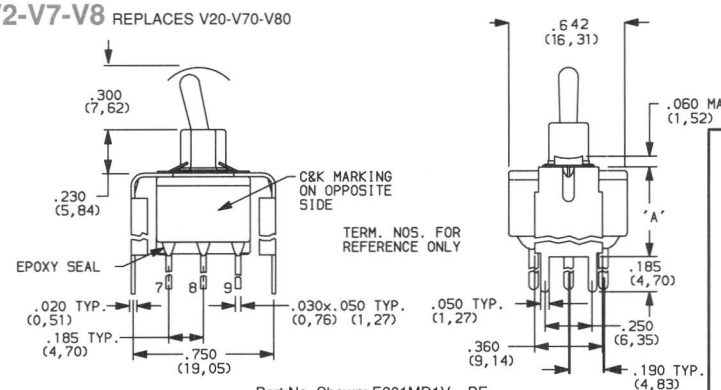
3PDT



V7

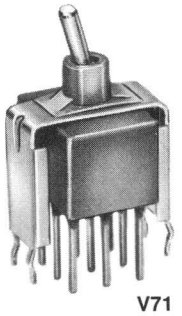
Actuator shown in pos.1.
B contact material std.
Available with D1 bushing only.

V2-V7-V8 REPLACES V20-V70-V80

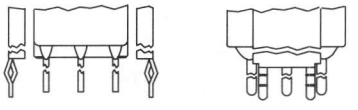


Part No. Shown: E301MD1V__BE

V21-V71-V81 SNAP-IN

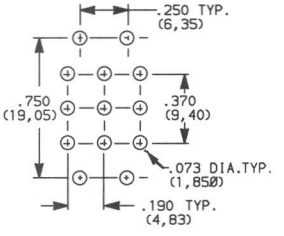


V71



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	E1XX & E2XX MODELS: 7.5 AMPS @125 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
M		TIN-LEAD [6]		E3XX MODELS: 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	E1XX AND E2XX MODELS:0.4 VA MAX @20 V AC OR DC MAX. OR 7.5 AMPS @125 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
L		TIN-LEAD [6]		E3XX MODELS: 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

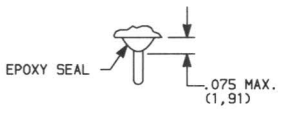
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

B contact material std. with all terminations.
B contact material must be ordered with R, R2 terminations.
K, L, M contact materials not available with Z terminations.

All models with all options when ordered with G, L, M or Q contact material.
See pages B-20 and VIII.

SEAL

E (STD.)



HOW TO ORDER

All available E SERIES SEALED TOGGLE SWITCH options are listed on page B-18, and are described on pages B-19 thru B-29. Switches with standard options are shown on page B-19. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. models available, see page B-20. Hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max. (B contact material).

ELECTRICAL LIFE: E1XX and E2XX MODELS: 40,000 make-and-break cycles at full load. E3XX MODELS: 30,000 cycles.

CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

ACTUATOR: Brass, chrome plated with internal o-ring seal std.

SWITCH SUPPORT: Brass or steel, tin plated.

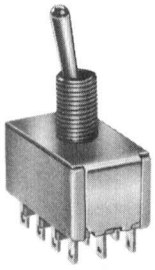
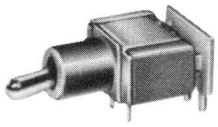
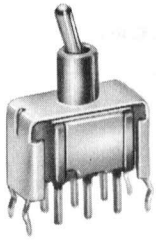
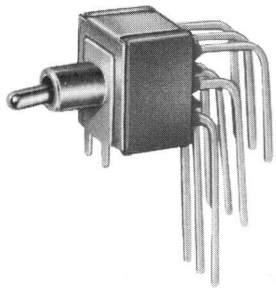
SWITCH SUPPORT RETAINER: Stainless steel.

CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact material).

TERMINAL SEAL: Epoxy.

HARDWARE: Nut & Locking ring – Brass, nickel plated. Lockwasher – Steel, nickel plated.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

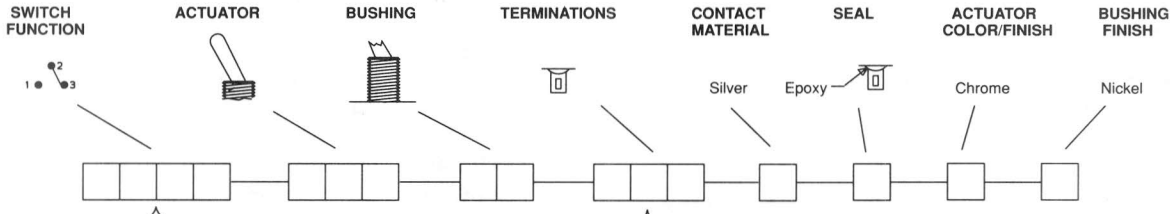





models available, see page B-32.

B

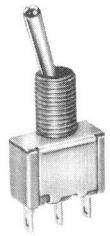
Easy Build-A-Switch:

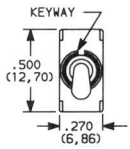
Below is a complete listing of available options for 7000 SERIES TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page B-31; all available options are shown and described on pages B-32 thru B-46. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-46. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

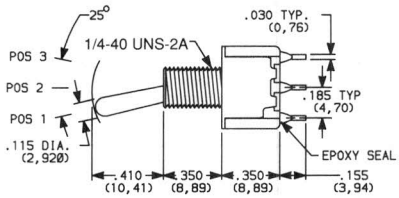


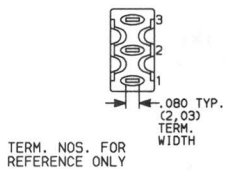
7101	U11	K	(NONE)	A	W	B	E	(NONE)	(NONE)
7103	U13	K1	CW	A2	W1	G	I	0	2
7105	U15	K8	D	A3	W3	K		1	
7107	U17	K18	D8	A4	W4	L		2	
7108	U18	L	D9	A7	W5	M		3	
7109	U19	L1	H	AV1	W6	Q		4	
7201	U21	L1P	H3	AV2	W7			5	
7203	U23	L2	H4	AV3	Z			6	
7205	U25	L2P	Y	AV4	Z3			7	
7207	U27	L3	Y1	AV5				8	
7208	U28	L3P	Y3	AW				9	
7209	U29	L40	Y4	AW1				S	
7211	U211	L41	Y9	AW3					
7213	U213	L42		AW4					
7215	U215	L43		AW5					
7301	U31	LP		AW6					
7303	U33	M		AW7					
7305	U35	MP		C					
7307	U37	P1		R					
7308	U38	P3		R2					
7309	U39	P4		V2					
7401	U41	S		V3					
7403	U43	SP		V4					
7405	U45	T		V6					
7407	U47	T1		V7					
7408	U48	T1P		V8					
7409	U49	T2P		V9					
7411	U411	TP		V21					
7413	U413			V31					
7415	U415			V41					
				V61					
				V71					
				V81					
				V91					

SWITCHES WITH STANDARD OPTIONS

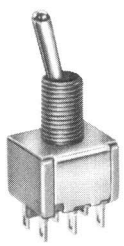


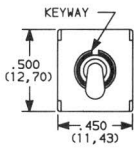


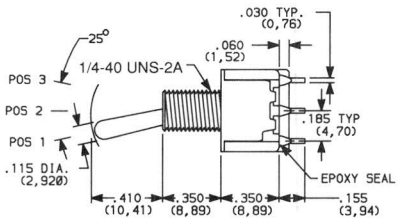


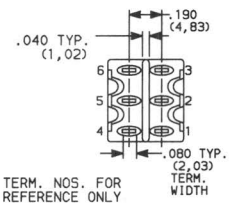


SPDT Part No. Shown: 7101SYZQE

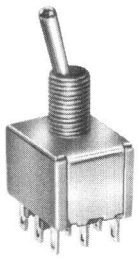


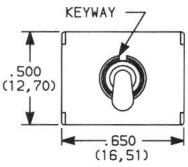


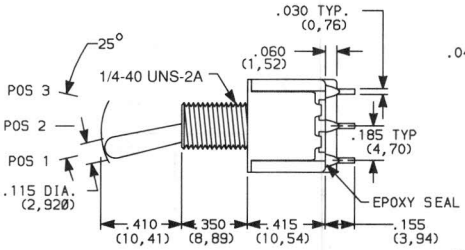


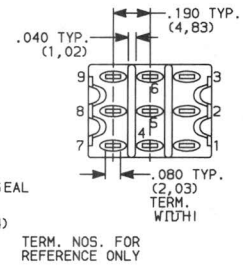


DPDT Part No. Shown: 7201SYZQE

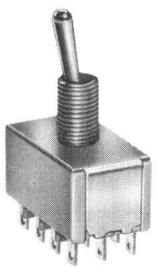


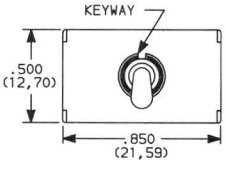


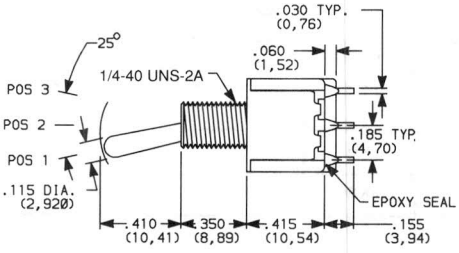


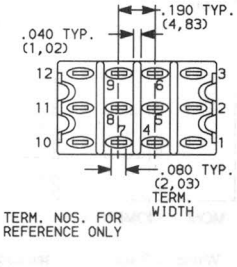


3PDT Part No. Shown: 7301SYZQE





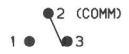
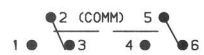
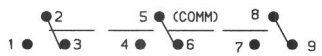
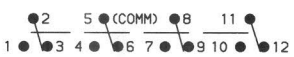




4PDT Part No. Shown: 7401SYZQE

B

SWITCH FUNCTION

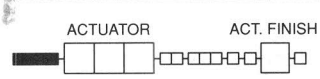
NO. POLES	MODEL NO.	UL/CSA** MODEL NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	7101	U11	ON	NONE	ON	2-3	OPEN	2-1	 SPDT
	7103	U13	ON	OFF	ON				
	7105	U15	MOM.	OFF	MOM.				
	7107	U17	ON	OFF	MOM.				
	7108	U18	ON	NONE	MOM.				
	7109	U19	NONE	ON	MOM.	N/A	2-3	2-1	
DP	7201	U21	ON	NONE	ON	2-3,5-6	OPEN	2-1,5-4	 DPDT
	7203	U23	ON	OFF	ON				
	7205	U25	MOM.	OFF	MOM.				
	7207	U27	ON	OFF	MOM.				
	7208	U28	ON	NONE	MOM.				
	7209	U29	NONE	ON	MOM.	N/A	2-3,5-6	2-1,5-4	
	7211*	U211*	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	
	7213*	U213*	ON	ON	MOM.				
	7215*	U215*	MOM.	ON	MOM.				
3P	7301	U31	ON	NONE	ON	2-3,5-6,8-9	OPEN	2-1,5-4,8-7	 3PDT
	7303	U33	ON	OFF	ON				
	7305	U35	MOM.	OFF	MOM.				
	7307	U37	ON	OFF	MOM.				
	7308	U38	ON	NONE	MOM.				
	7309	U39	NONE	ON	MOM.	N/A	2-3,5-6,8-9	2-1,5-4,8-7	
4P	7401	U41	ON	NONE	ON	2-3,5-6,8-9,11-12	OPEN	2-1,5-4,8-7,11-10	 4PDT
	7403	U43	ON	OFF	ON				
	7405	U45	MOM.	OFF	MOM.				
	7407	U47	ON	OFF	MOM.				
	7408	U48	ON	NONE	MOM.				
	7409	U49	NONE	ON	MOM.	N/A	2-3,5-6,8-9,11-12	2-1,5-4,8-7,11-10	
	7411*	U411*	ON	ON	ON	2-3,5-6,8-9,11-12	2-3,5-4,8-9,11-10	2-1,5-4,8-7,11-10	
	7413*	U413*	ON	ON	MOM.				
	7415*	U415*	MOM.	ON	MOM.				

MOM. = MOMENTARY

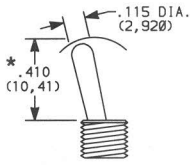
* Wiring for 3-way switch, see page X.

** U11-U415 model nos. with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.
Z termination option CSA certified only when ordered with I epoxy base seal.

ACTUATOR

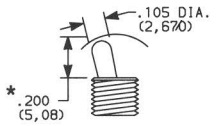


S
SP ANTIROTATION [1,2]



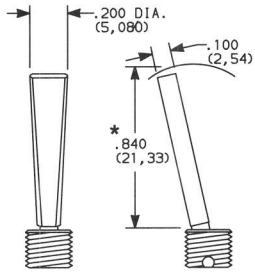
S actuator std. when ordered with Z, C, Z3 or W-W5 terminations.

M
MP ANTIROTATION [1,2]

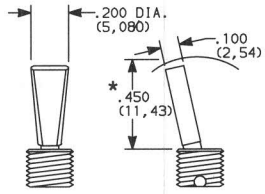


M actuator standard when ordered with all terminations except Z, C, Z3, W-W5 terminations.

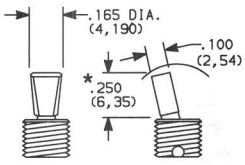
P1 ANTIROTATION [2]



P3 ANTIROTATION [2]

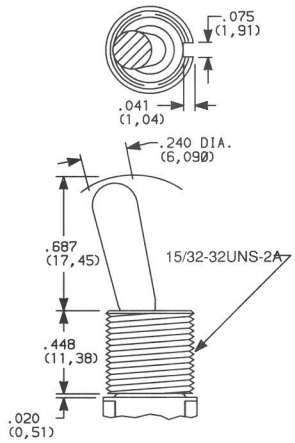


P4 ANTIROTATION [2]

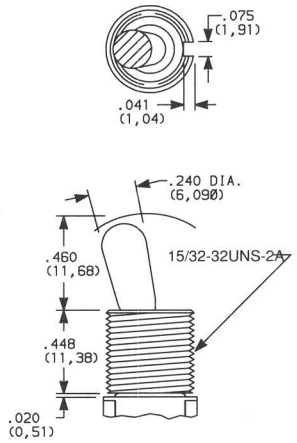


Dress nut P/N 709901201 supplied standard with threaded bushing.

T
TP ANTIROTATION [2]

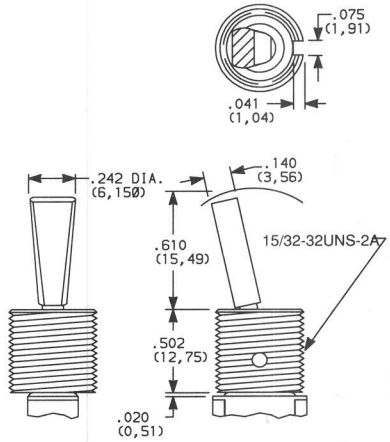


T1
T1P ANTIROTATION [2]



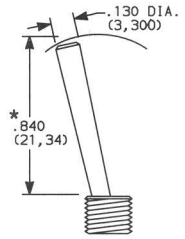
Bushing option code not required unless CW splashproof bushing desired.
TP, T1P actuators not available with CW splashproof bushing. All TXX actuators not available on single pole models with A–A7, AW–AW7, R, R2 terminations.

T2P ANTIROTATION [2]

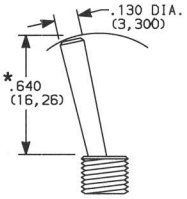


Bushing option code not required.
T2P actuator not available with CW splashproof bushing or single pole models with A–A7, AW–AW7, R, R2 terminations.

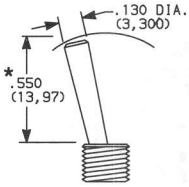
L
LP ANTIROTATION [1,2]



L1
L1P ANTIROTATION [1,2]



L2
L2P ANTIROTATION [1,2]



ACTUATOR FINISH

SX, LXX, MX, PX, TXX actuators.

OPTION CODE	ACTUATOR FINISH
(NONE)	BRIGHT CHROME – WITH NICKEL PLATED BUSHING** (STD.)
0	BRIGHT CHROME – WITH BLACK BUSHING.**
S	SATIN CHROME
2	BLACK

Select actuator finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black actuators or bushings are specified. All hardware is available separately, see catalog section H.

** See BUSHING FINISH page B-35.

[1] S, M, L, L1, L2, TXX actuators not available with Y1 bushing.
[2] SP, MP, P1, P3, P4, TXX, LP, L1P, L2P actuators not available with H4 bushing.

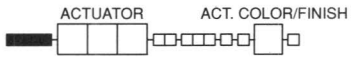
* Add .070 (1,78) for D, D8, D9 bushings, subtract .020 (0,51) for H3 bushing.

Antirotation: provides anti-'push-in' feature on actuator.

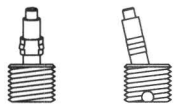
All hardware is available separately, see catalog section H.

B

ACTUATOR

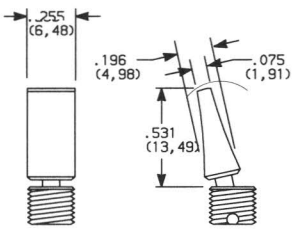


L40 ANTIROTATION [1]

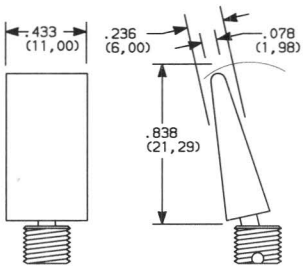


No color choice required.

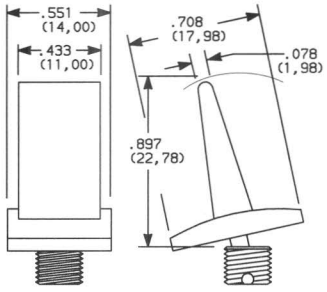
L41 PLASTIC LEVER HANDLE– ANTIROTATION [1]



L42 PLASTIC LEVER HANDLE– ANTIROTATION [1]



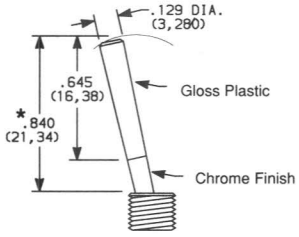
L43 PLASTIC LEVER HANDLE– ANTIROTATION [1]



Finish: matte (L41, L42, L43).

L41, L42, L43 lever handle actuators supplied not installed. For interchangeability, order L40 actuator option and order lever handles separately, see hardware, catalog section H.

L3 PLASTIC
L3P ANTIROTATION



L3 actuator not available with Y1 bushing.

* Add .070 (1,78) for D, D8, D9 bushings; subtract .020 (0,51) for H3 bushing.

[1] L4X actuators not available with H4, Y1, Y4 bushings.
Antirotation: provides anti-'push-in' feature on actuator.

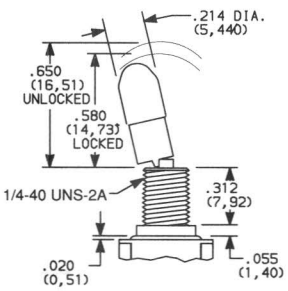
ACTUATOR COLOR

LXX actuators (except L40).

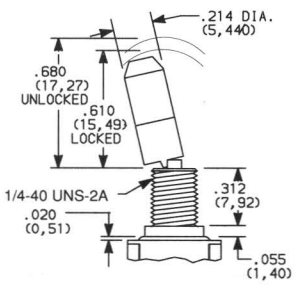
OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (STD.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select actuator color from chart. Place option code (if required) in appropriate box of ordering format. No color choice required for L40 actuator.

K LOCKING LEVER
K8 UNTHREADED



K1 LOCKING LEVER
K18 UNTHREADED



Keyway on right side.

Bushing code not required unless CW splashproof bushing desired.

K8, K18 actuators available with all terminations on models ending in -01 and with A–A7, AW–AW7, AVX, R, R2, V2–V91 terminations on all other models.

To prevent accidental actuation, toggles must be lifted before being actuated. When released, toggles again lock in place.

Please note: Overtightening mounting nut may cause actuator to bind.

ACTUATOR CAP FINISH

KXX actuators.

OPTION CODE	ACTUATOR FINISH
(NONE)	NATURAL AL. – WITH NICKEL PLATED BUSHING** (STD.)
0	NATURAL AL. - WITH BLACK BUSHING**
2	BLACK ANODIZED AL.
3	RED ANODIZED AL.
7	BLUE ANODIZED AL.

Select actuator cap finish from chart. Place option code (if required) in appropriate box of ordering format.

** See BUSHING FINISH, page B-35.

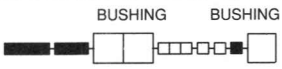
K, K1, K8, K18 Locking Positions



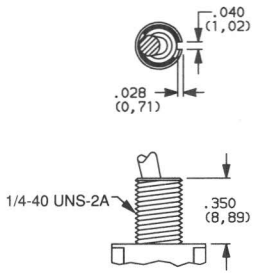
-01 Models 2 Pos. Lock | -03,-11 Models 3 Pos. Lock | -05,-09,-15 Models 1 Pos. Lock | -07,-13 Models 2 Pos. Lock | -08 Models 1 Pos. Lock

Keyway on right side.

BUSHING



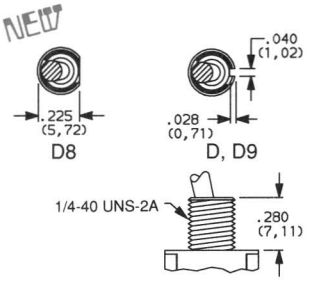
Y
Y9 UNTHREADED



Y bushing std. with Z, C, Z3 or W-W5 terminations.

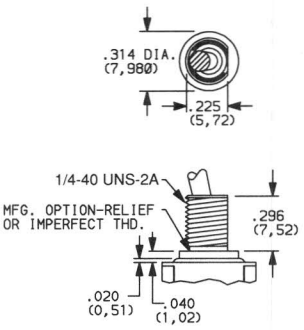
D KEYWAY
D9 UNTHREADED KEYWAY
D8 UNTHREADED FLAT

NEW

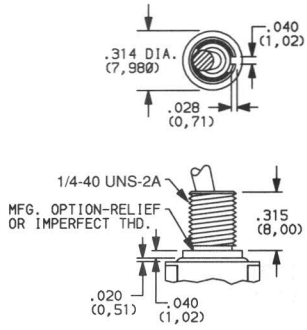


D9 bushing std. with all terminations except Z, C, Z3, or W–W5.
Add .070 (1,78) to all actuator lengths with D, D8, D9 bushings.

H HIGH TORQUE [1, 2]

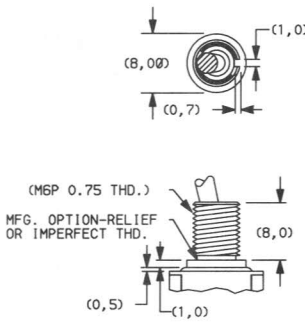


H3 HIGH TORQUE [1, 2]

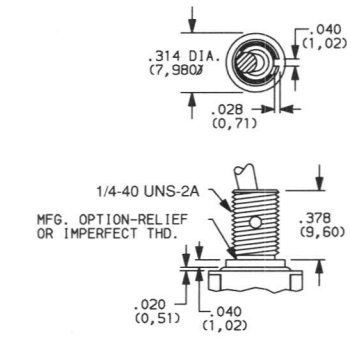


Subtract .020 (0,51) from all actuator lengths for H3 bushing.

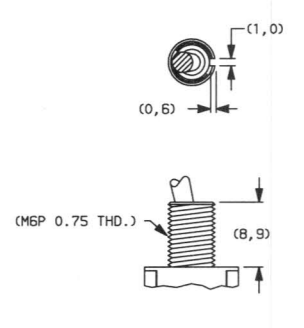
H4 METRIC HIGH TORQUE [1, 2, 3]



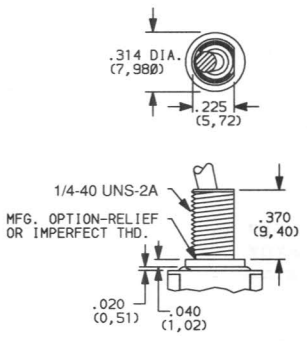
Y1 HIGH TORQUE [1, 2]



Y3 METRIC [4]

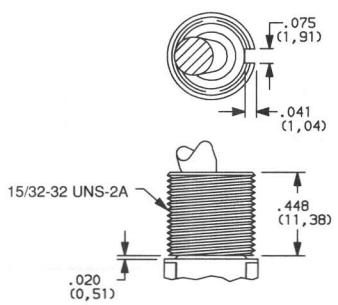


Y4 HIGH TORQUE [1, 2, 5]



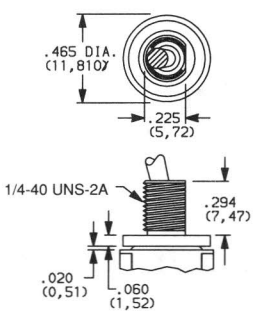
CW SPLASHPROOF [1]

For T, T1 actuators.



Internal actuator seal std. External bushing seal washer available from:
Multi–Flex Seals, Inc., Hackensack, NJ
P/N MFS–60064

For actuators other than T, T1.



Internal actuator seal and external bushing seal washer std.

BUSHING FINISH

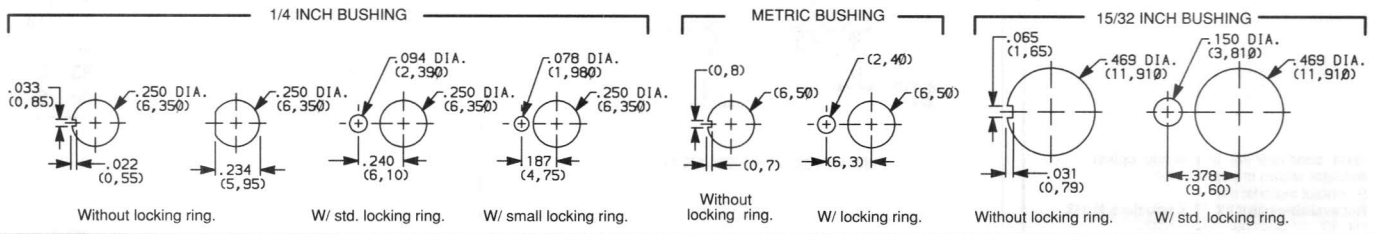
OPTION CODE	BUSHING FINISH
(NONE)	NICKEL (STD.)
2	BLACK OXIDE

Select bushing finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black bushings or actuators are specified. All hardware is available separately, see catalog section H.

Notes
1 Will withstand 12 in.-lbs. of torque with no distortion.
2 H, H3, H4, Y1, Y4 bushings not available on single pole models with A-A7, AW-AW7, R, R2 terminations.
3 H4 bushing available only with S, M, L, L1, L2, L3 actuators.
4 Y1 bushing available only with SP, MP, PX, LP, LXP actuators.
5 Y4 bushing not available with L4X actuators.

Hardware: Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Black hardware is supplied when either black bushings or actuators are specified. Optional mounting nut and locking ring styles and finishes available, see HARDWARE, catalog section H.

PANEL MOUNTING

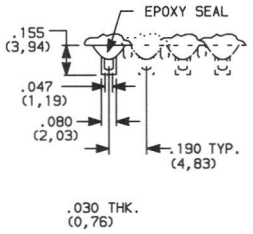


Without locking ring. | W/ std. locking ring. | W/ small locking ring. | Without locking ring. | W/ locking ring. | Without locking ring. | W/ std. locking ring.

B

TERMINATIONS

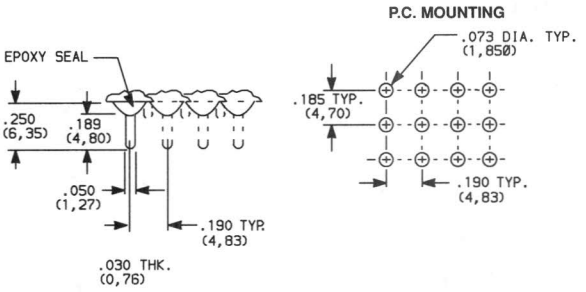
Z (STD.)



SPDT thru **4PDT**

Q contact material std.
Not avail. with K, L, or M contact material.

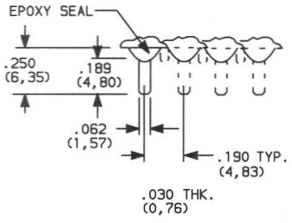
C



SPDT thru **4PDT**

Q contact material std.

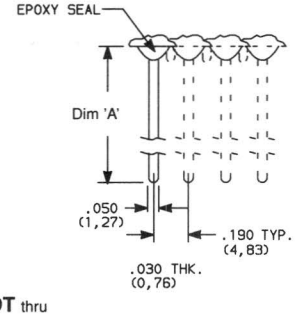
Z3 QUICK CONNECT



SPDT thru **4PDT**

Q contact material std.
Mating quick connector available; order part no. 530100000.

W-W1-W3-W4-W5 WIRE WRAP

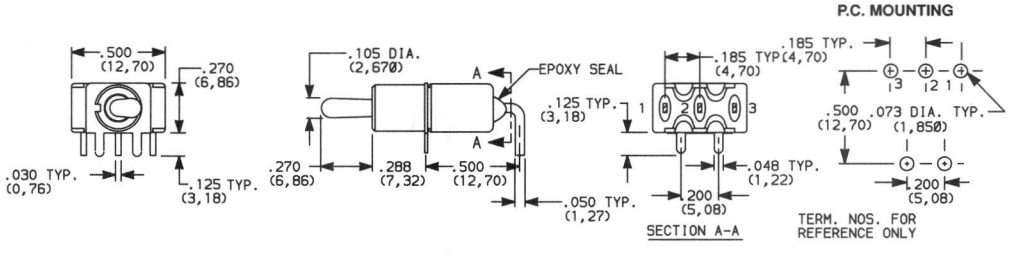


Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,48)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

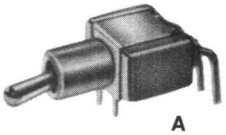
SPDT thru **4PDT**

B contact material std.

A



Part No. Shown: 7101MD9ABE

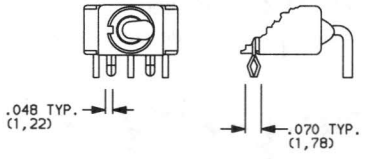


A

SPDT

A3 SNAP-IN

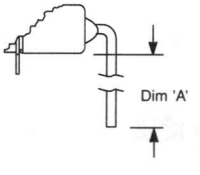
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4-AW5 EXTENDED

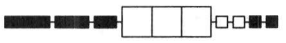
NEW



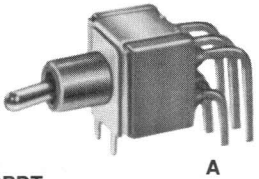
Option	Dim 'A'
AW	.50 (12,7)
AW1	.72 (18,3)
AW3	.20 (5,1)
AW4	.83 (21,1)
AW5	1.08 (27,4)

Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with KXX, TXX actuators, H, H3, H4, Y1, Y4 bushings, I seal option.

TERMINATIONS



B

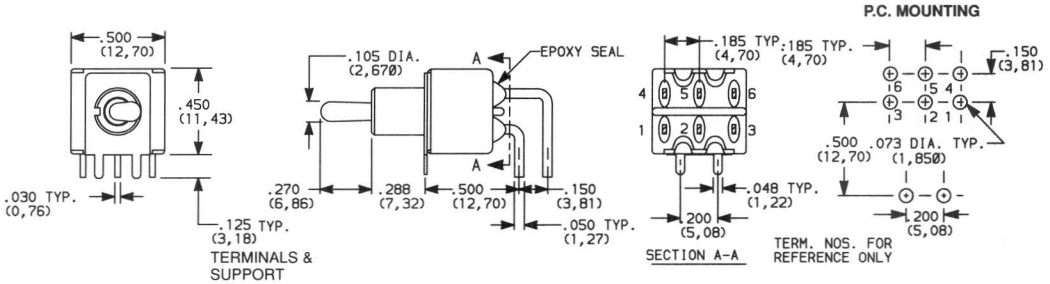


DPDT

A

Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

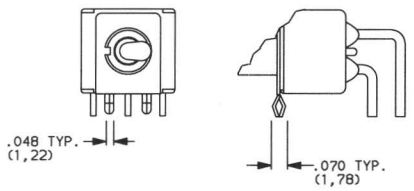
A



Part No. Shown: 7201MD9ABE

A3 SNAP-IN

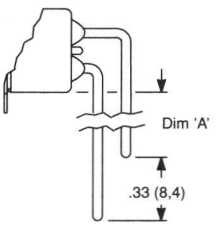
NEW



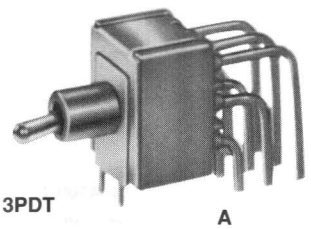
SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW4-AW5 EXTENDED

NEW



Option	Dim 'A'
AW	.19 (4,8)
AW1	.40 (10,2)
AW4	.50 (12,7)
AW5	.74 (18,8)

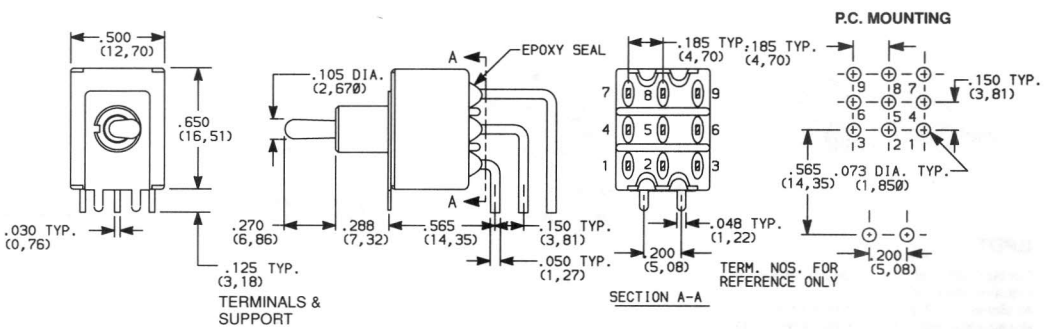


3PDT

A

Term. bend radii and lead–in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

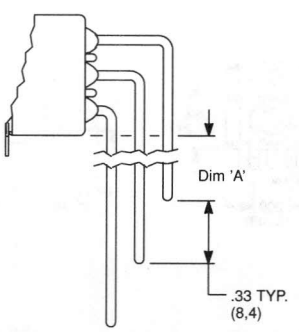
A



Part No. Shown: 7301MD9ABE

AW4-AW5 EXTENDED

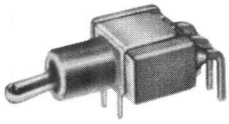
NEW

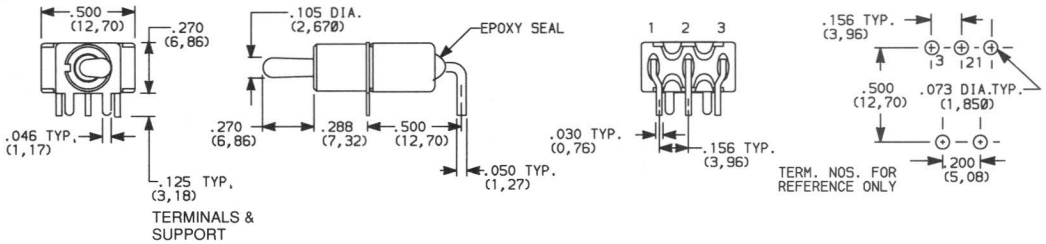


Option	Dim 'A'
AW4	.18 (4,6)
AW5	.40 (10,2)

TERMINATIONS

A2



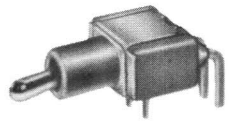


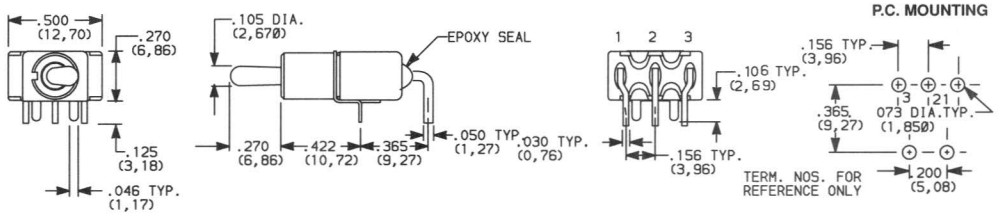
SPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with KXX, TXX actuators, H, H3, H4, Y1, Y4 bushings, I seal option.

Part No. Shown: 7101MD9A2BE

A4





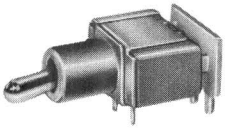
SPDT

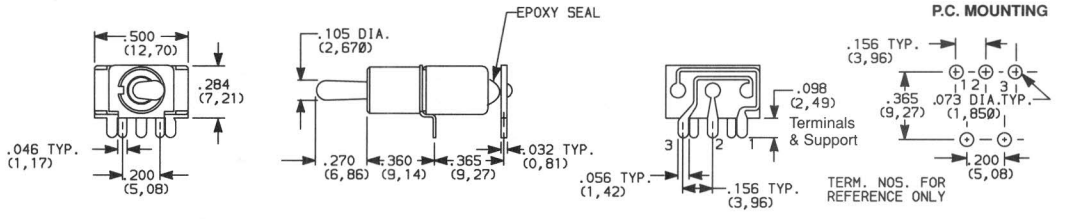
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with KXX, TXX actuators, H, H3, H4, Y1, Y4 bushings, I seal option.

The A4 and R2 termination options are functionally identical and fit the same P.C. mounting pattern. The switches, however, are shifted relative to the mounting holes. Unlike the R2, the A4 option is available with any contact material and can be UL recognized and CSA certified. Note that the P.C. pattern must clear switch support legs.

Part No. Shown: 7101MD9A4BE

R



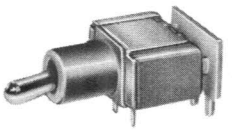


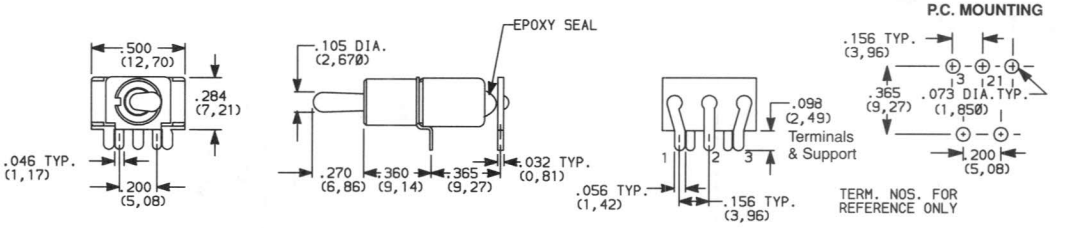
SPDT

Contact makes on same side act. thrown.
Actuator shown in pos. 1.
Available with B contact material only.
Not available with KXX, TXX actuators, H, H3, H4, Y1, Y4 bushings, I seal option.

Part No. Shown: 7101MD9RBE

R2



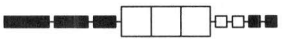


SPDT

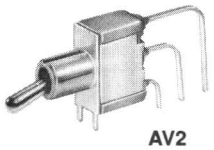
Contact makes on opposite side act. thrown.
Actuator shown in pos. 1.
Available with B contact material only.
Not available with KXX, TXX actuators, H, H3, H4, Y1, Y4 bushings, I seal option.

Part No. Shown: 7101MD9R2BE

TERMINATIONS



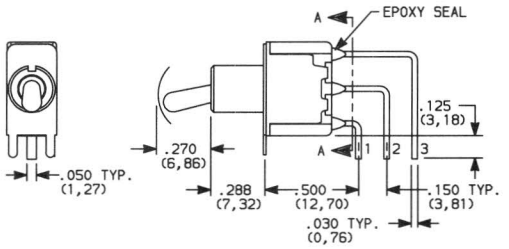
B



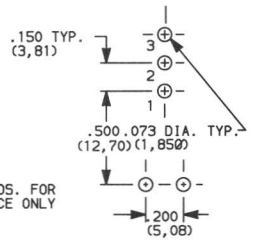
AV2

SPDT

AV2



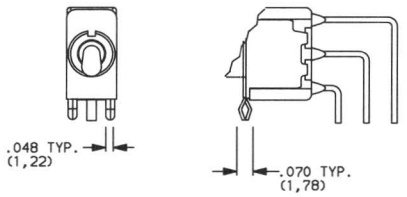
P.C. MOUNTING



Part No. Shown: 7101MD9AV2BE

AV3 SNAP-IN

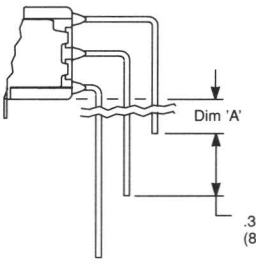
NEW



SNAP-IN DESIGN RETAINS SWITCH.

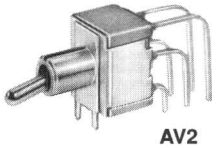
AV1-AV4-AV5 EXTENDED

NEW



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)

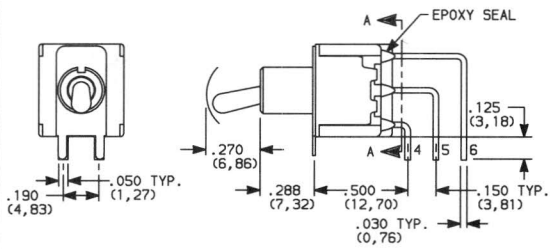
Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.



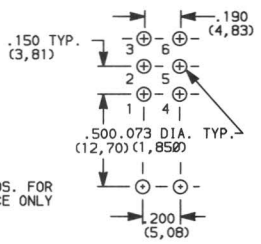
AV2

DPDT

AV2



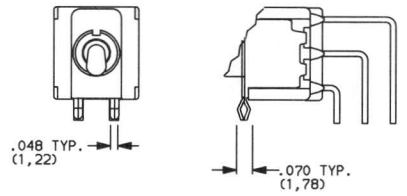
P.C. MOUNTING



Part No. Shown: 7201MD9AV2BE

AV3 SNAP-IN

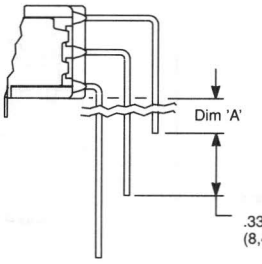
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED

NEW

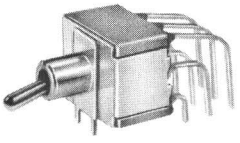


Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)

Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

TERMINATIONS

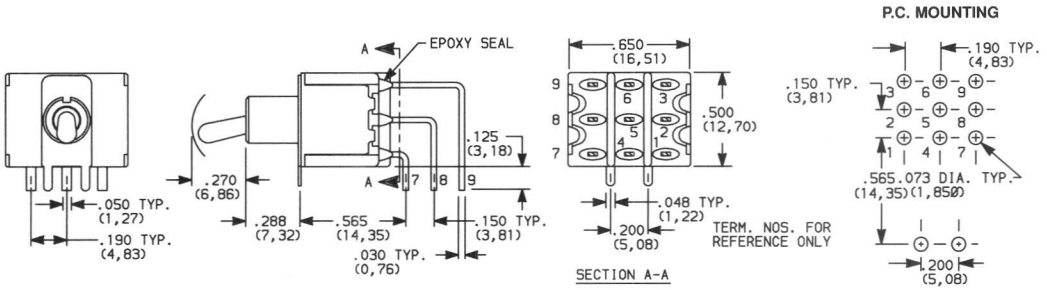
B



3PDT AV2

Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

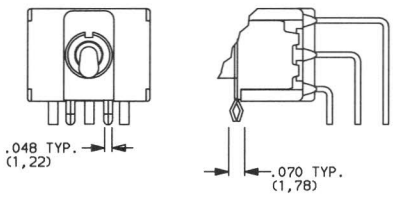
AV2



Part No. Shown: 7301MD9AV2BE

A3 SNAP-IN

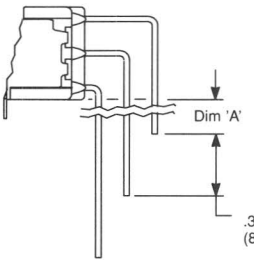
NEW



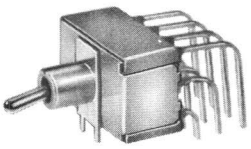
SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED

NEW



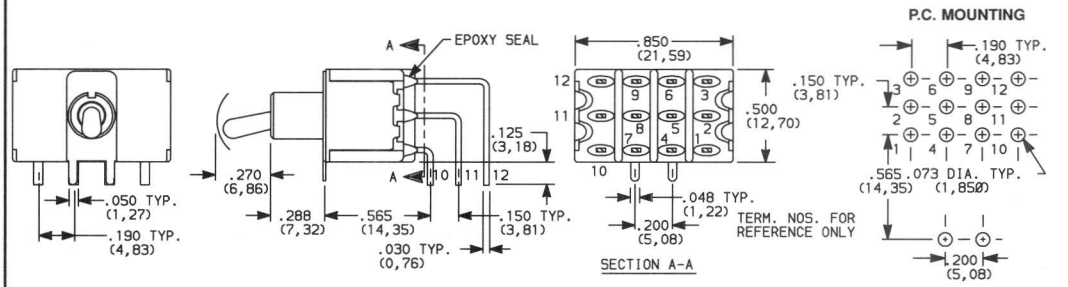
Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)



4PDT AV2

Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

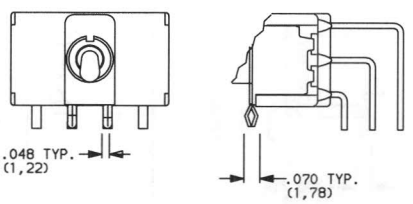
AV2



Part No. Shown: 7401MD9AV2BE

AV3 SNAP-IN

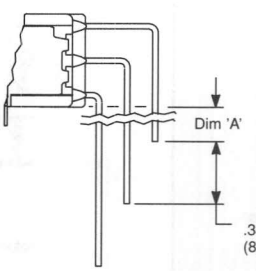
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED

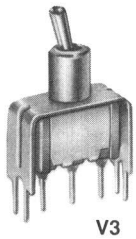
NEW



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)

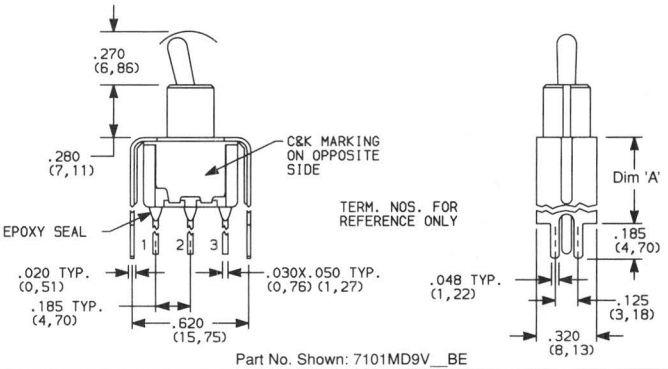
TERMINATIONS

SPDT



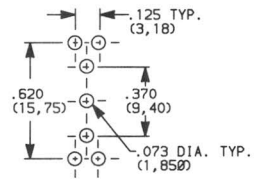
V3

V3-V4-V9 REPLACES V30-V40-V90



Part No. Shown: 7101MD9V__BE

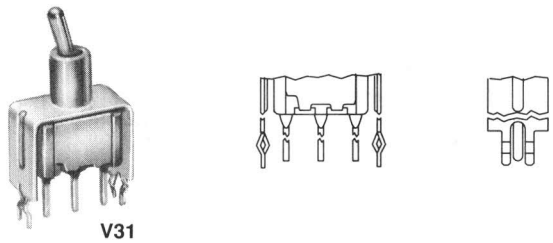
P.C. MOUNTING



Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V31-V41-V91 SNAP-IN

NEW

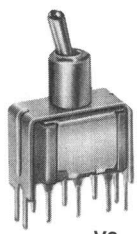


V31

SNAP-IN DESIGN RETAINS SWITCH.

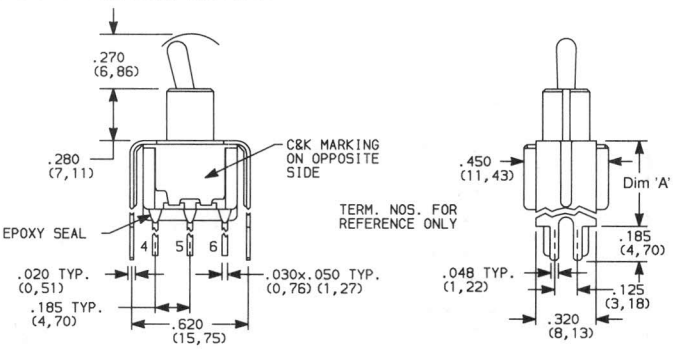
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

DPDT



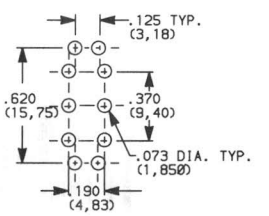
V3

V3-V4-V9 REPLACES V30-V40-V90



Part No. Shown: 7201MD9V__BE

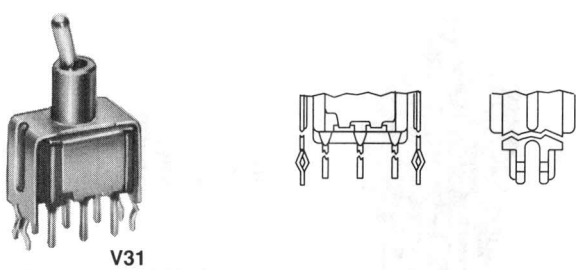
P.C. MOUNTING



Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V31-V41-V91 SNAP-IN

NEW



V31

SNAP-IN DESIGN RETAINS SWITCH.

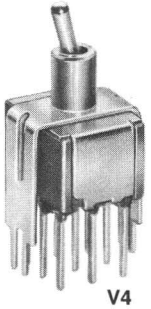
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

TERMINATIONS

B

NEW

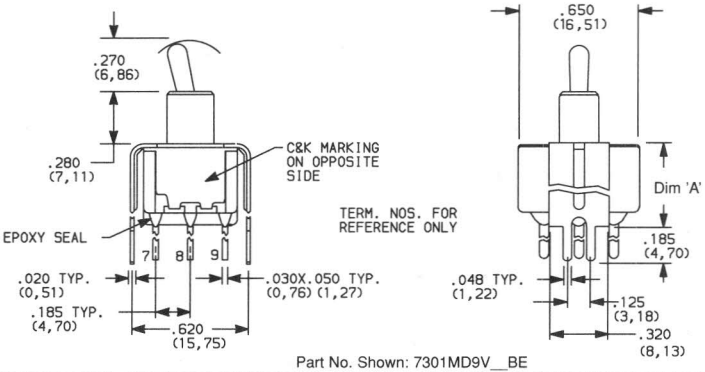
3PDT



V4

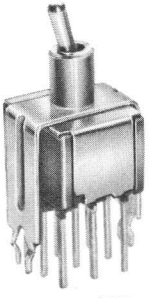
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

V4-V9 REPLACES V40-V90

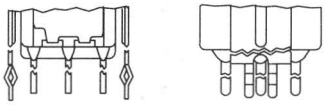


Part No. Shown: 7301MD9V__BE

V41-V91 SNAP-IN

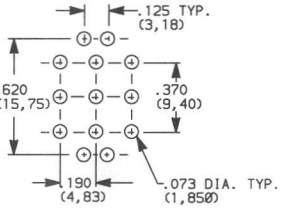


V41



SNAP-IN DESIGN RETAINS SWITCH.

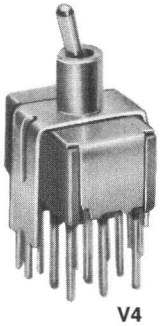
P.C. MOUNTING



Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

NEW

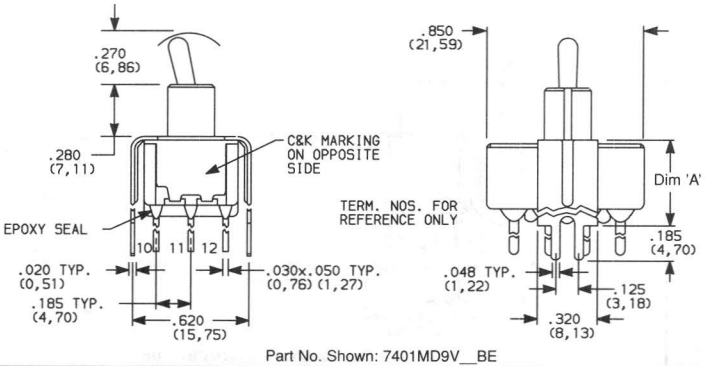
4PDT



V4

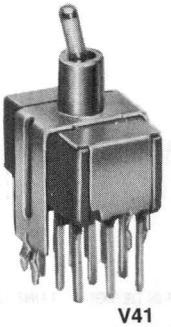
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

V4-V9 REPLACES V40-V90

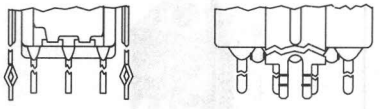


Part No. Shown: 7401MD9V__BE

V41-V91 SNAP-IN

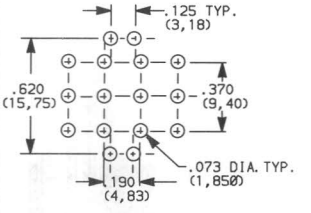


V41



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING

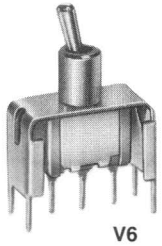


Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

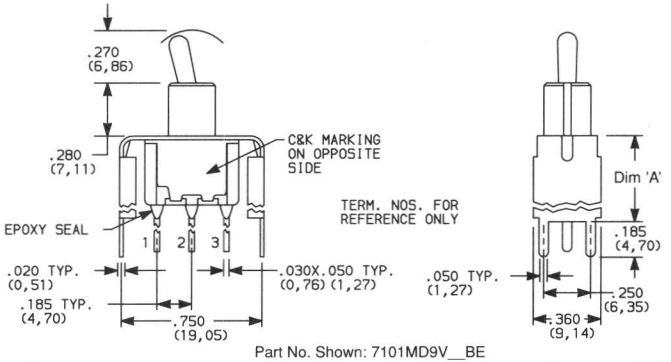
TERMINATIONS

B

V2-V6-V7-V8 REPLACES V20-V60-V70-V80

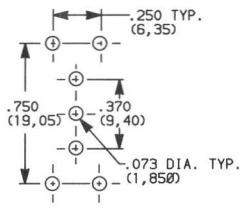


SPDT V6



Part No. Shown: 7101MD9V__BE

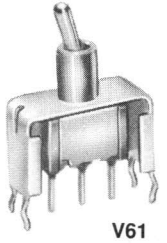
P.C. MOUNTING



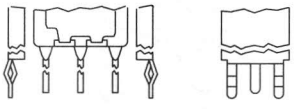
Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V21-V61-V71-V81 SNAP-IN

NEW



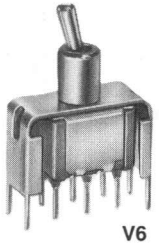
V61



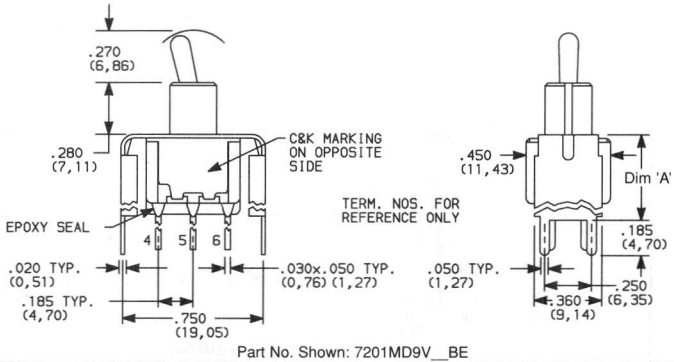
SNAP-IN DESIGN RETAINS SWITCH.

Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

V2-V6-V7-V8 REPLACES V20-V60-V70-V80

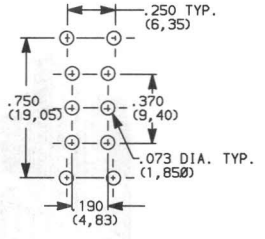


DPDT V6



Part No. Shown: 7201MD9V__BE

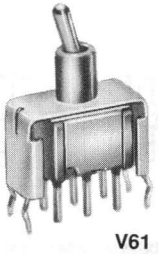
P.C. MOUNTING



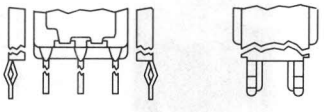
Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V21-V61-V71-V81 SNAP-IN

NEW



V61



SNAP-IN DESIGN RETAINS SWITCH.

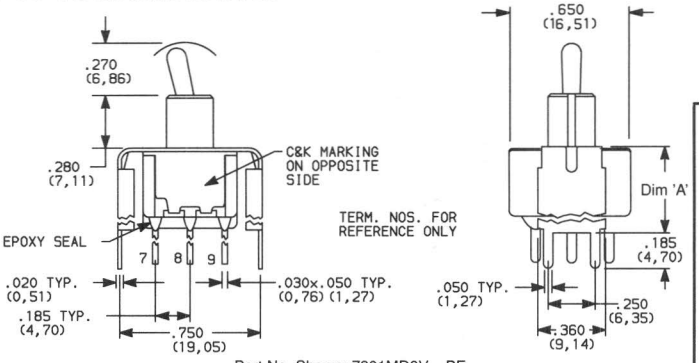
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

B

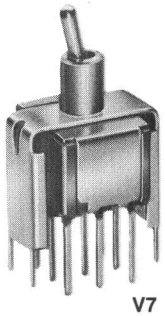
TERMINATIONS

NEW

V2-V7-V8 REPLACES V20-V70-V80



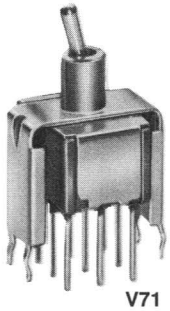
Part No. Shown: 7301MD9V__BE



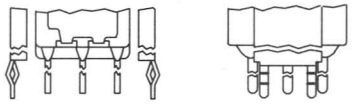
3PDT

V7

V21-V71-V81 SNAP-IN

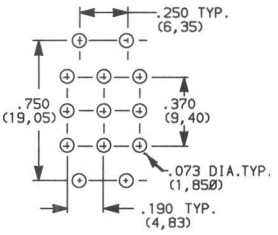


V71



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING

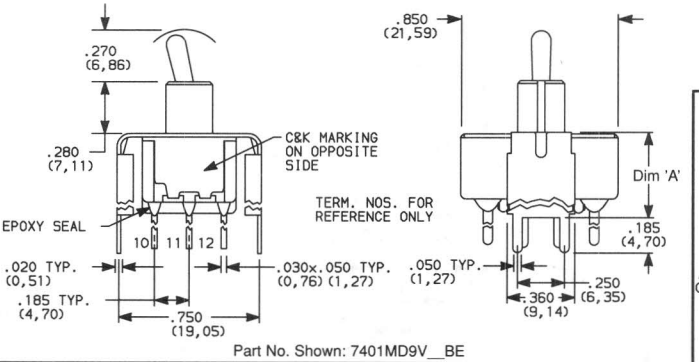


Option	Dim 'A'
V2, V21	.555 (14,10)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

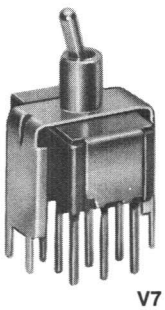
Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

NEW

V2-V7-V8 REPLACES V20-V70-V80



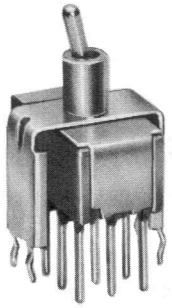
Part No. Shown: 7401MD9V__BE



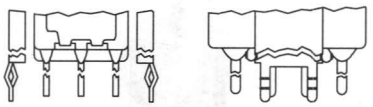
4PDT

V7

V21-V71-V81 SNAP-IN

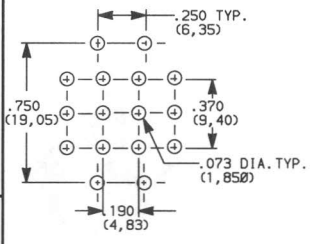


V71



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING

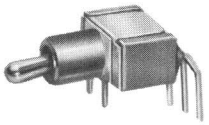


Option	Dim 'A'
V2, V21	.555 (14,10)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

Actuator shown in pos. 1.
B contact material std.
Not available with I seal option.

TERMINATIONS

REPLACES W SERIES



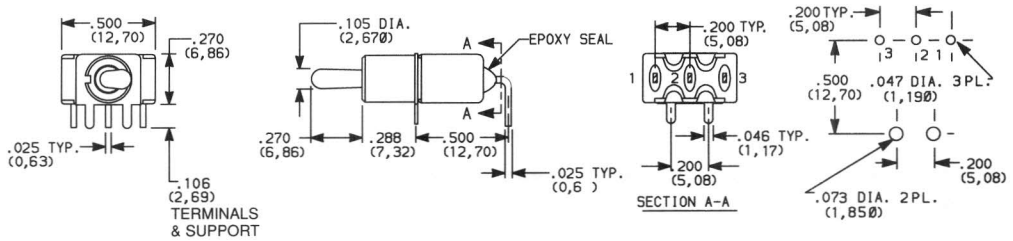
A7

SPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos. 1.
Available with B contact material only.
Not available with KXX, TXX actuators, H, H3, H4, Y1, Y4 bushings, I seal option.

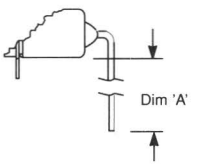
A7 .025 WIRE-WRAP – .200 SPACING

P.C. MOUNTING



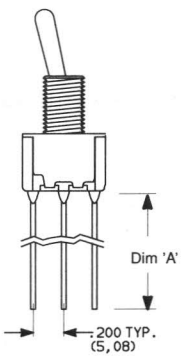
Part No. Shown: 7101MD9A7BE

AW6-AW7 EXTENDED



Terminals – .025 (0,64) sq.

Option	Dim 'A'
AW6	.42 (10,7)
AW7	.55 (14,0)



Option	Dim 'A'
W6	.655 (16,64)
W7	.780 (19,81)

Terminals – .025 (0,64) sq.

Part No. Shown: 7101SYW__BE

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	5 AMPS @120 V AC OR 28 V DC; 2 AMPS @ 250 V AC;
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @20 V AC OR DC MAX. OR 5 AMPS @120 V AC OR 28 V DC; 2 AMPS @ 250 V AC
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

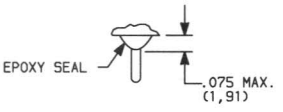
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

B contact material std. with all terminations except Z, C, Z3.
B contact material must be ordered with A7, AW6–AW7, R, R2, W6–W7 terminations.
Q contact material std. with Z, C, Z3 terminations.
K, L, M contact materials not available with Z terminations.

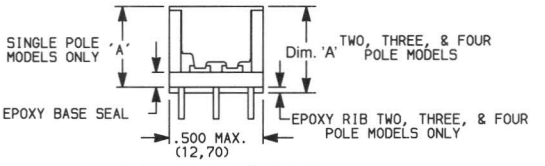
U11-U415 model nos. with all options when ordered with G, L, M or Q contact material.
See pages B-32 and VIII. Z termination option CSA certified only when ordered with I epoxy seal.

SEAL

E (STD.)



I



Poles	Dim 'A'
SP	.410 (10,41)
DP	.440 (11,18)
3P	.505 (12,83)
4P	.505 (12,83)

Available with Z, C, Z3, W–W5 terminations only.

B

HOW TO ORDER

All available 7000 SERIES TOGGLE SWITCH options are listed on page B-30, and are described on pages B-31 thru B-46. Switches with standard options are shown on page B-31. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page B-32. Hardware and accessories are available separately, see catalog section H.

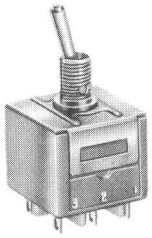
SPECIFICATIONS

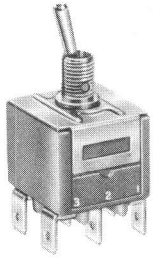
CONTACT RATING: 5 AMPS @ 120 V AC or 28 V DC;
2 AMPS @ 250 V AC (Q contact mat'l).
ELECTRICAL LIFE: 7X01 and UX1 MODELS: 100,000 make-and-break cycles at full load. All other models, 40,000 cycles.
CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30°C to 85°C.
SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS–186E method 9 (1 hr. steam aging).

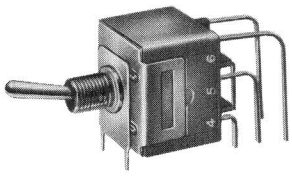
MATERIALS

CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP) (UL 94V-0).
ACTUATOR: Brass, chrome plated.
BUSHING: Brass or zinc, nickel plated.
HOUSING: Stainless steel.
SWITCH SUPPORT: Brass or steel, tin plated.
END CONTACTS: Coin silver, silver plated (Q contact mat'l).
CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l).
TERMINAL SEAL: Epoxy
HARDWARE: Nut & Locking ring – Brass, nickel plated.
Lockwasher – Steel, nickel plated.

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.



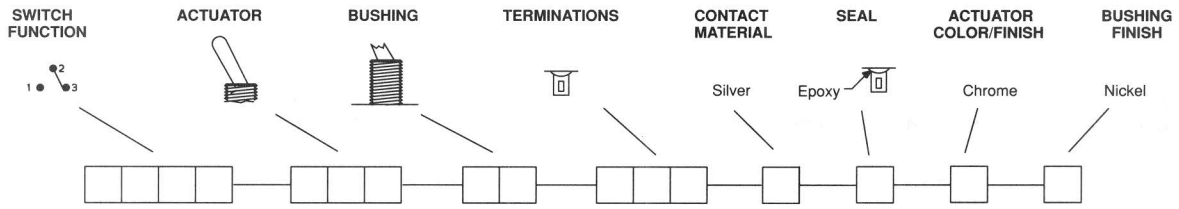




All 9000 Series models meet international dimensional and electrical requirements.

Easy Build-A-Switch:

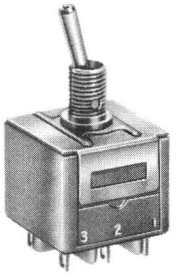
Below is a complete listing of available options for 9000 SERIES POWER TOGGLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page B-48; all available options are shown and described on pages B-48 thru B-52. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page B-52. Hardware and accessories are available separately, see catalog section H.



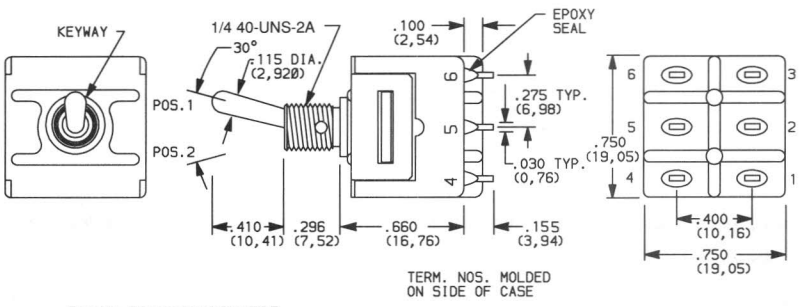
SWITCH FUNCTION	ACTUATOR	BUSHING	TERMINATIONS	CONTACT MATERIAL	SEAL	ACTUATOR COLOR/FINISH	BUSHING FINISH
9201	K	CW	AV2	Q	D	(NONE)	(NONE)
9221	K1	H	C		E	0	2
	K8	H3	W			1	
	K18		W1			2	
	L		W3			3	
	L1		W4			4	
	L2		W5			5	
	L3		Z			6	
	L4		Z3			7	
	L40		Z4			8	
	L41					9	
	L42					S	
	L43						
	P1						
	P3						
	P4						
	S						
	T						
	T1						

B

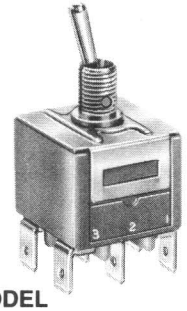
SWITCHES WITH STANDARD OPTIONS



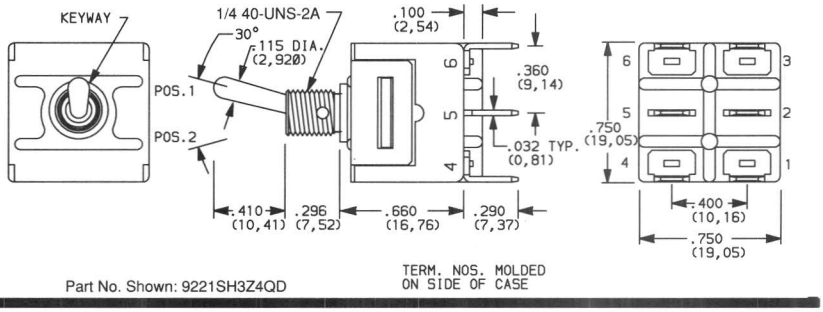
DPDT
6 AMP MODEL



Part No. Shown: 9201SH3ZQE



DPDT
10 AMP MODEL



Part No. Shown: 9221SH3Z4QD

SWITCH FUNCTION

NO. POLES	MODEL NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	SCHEMATIC
DP	9201	ON	ON	2-3,5-6	2-1,5-4	DPDT: 2 (COMM) 5 / 1 3 4 6
	9221	ON	ON			

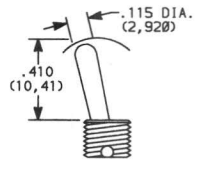
All 9000 Series models meet international dimensional and electrical requirements.

9221 model must be ordered with Z4 terminations and D seal option.

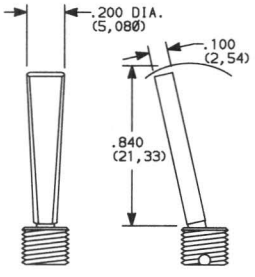
ACTUATOR

ACTUATOR ACT. FINISH

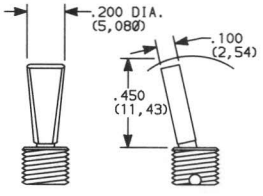
S (STD.)



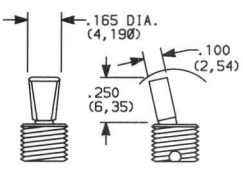
P1



P3



P4



Dress nut P/N 709901201 supplied standard with P1, P3, P4 actuators.
Antirotation: Standard on all actuators, provides anti-'push-in' feature on actuator.

ACTUATOR FINISH

OPTION CODE	ACTUATOR FINISH
(NONE)	BRIGHT CHROME – W/ NICKEL PLATED BUSHING* (STD.)
0	BRIGHT CHROME – WITH BLACK BUSHING.*
S	SATIN CHROME
2	BLACK

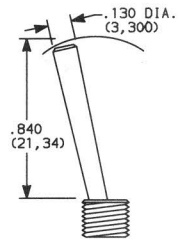
Select actuator finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black actuators or bushings are specified. All hardware is available separately, see catalog section H.

* See BUSHING FINISH, page B-50.

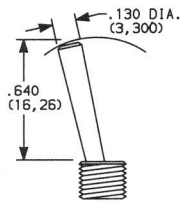
ACTUATOR

ACTUATOR ACT. COLOR/FINISH

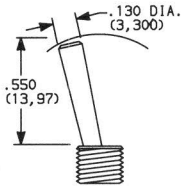
L



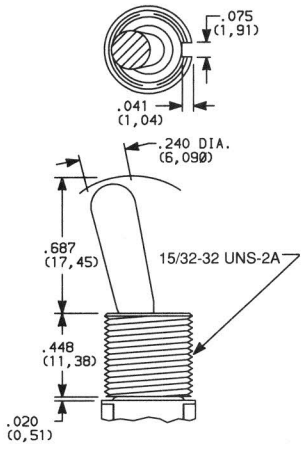
L1



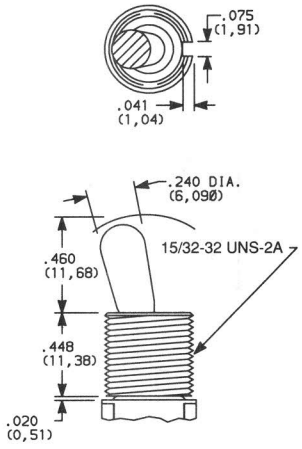
L2



T



T1



Bushing option code not required unless CW splashproof bushing desired.

ACTUATOR FINISH

LX, TX Actuators

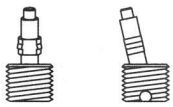
OPTION CODE	ACTUATOR FINISH
(NONE)	BRIGHT CHROME – WITH NICKEL PLATED BUSHING* (STD.)
0	BRIGHT CHROME – WITH BLACK BUSHING.*
S	SATIN CHROME
2	BLACK

Select actuator finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black actuators or bushings are specified. All hardware is available separately, see catalog section H.

* See BUSHING FINISH page B-50.

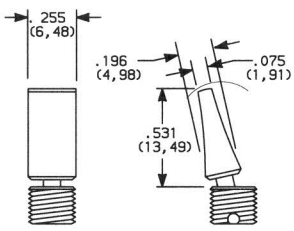
Antirotation: Standard on all actuators, provides anti-'push-in' feature on actuator.

L40

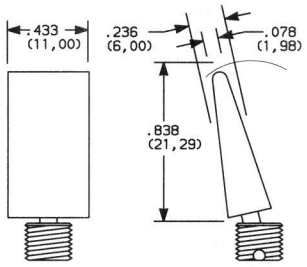


No color choice required.

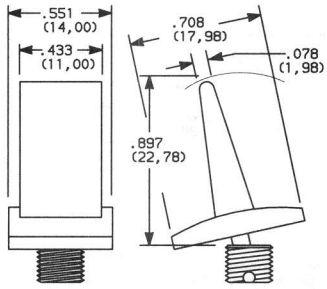
L41 PLASTIC LEVER HANDLE



L42 PLASTIC LEVER HANDLE

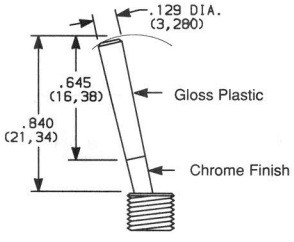


L43 PLASTIC LEVER HANDLE

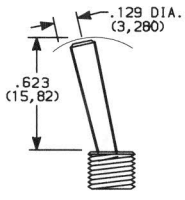


Finish: matte (L41, L42, L43).
L41, L42, L43 lever handle actuators supplied not installed. For interchangeability, order L40 actuator option and order lever handles separately, see hardware, catalog section H.

L3 PLASTIC



L4 PLASTIC



Finish: gloss

ACTUATOR COLOR

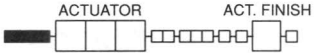
LXX Actuators (except L40)

OPTION CODE	ACTUATOR COLOR	OPTION CODE	ACTUATOR COLOR
1	WHITE	6	GREEN
2	BLACK (STD.)	7	BLUE
3	RED	8	BROWN
4	ORANGE	9	GRAY
5	YELLOW		

Select actuator color from chart. Place option code (if required) in apppropriate box of ordering format. No color choice required for L40 actuator.

Antirotation: Standard on all actuators, provides anti-'push-in' feature on actuator.

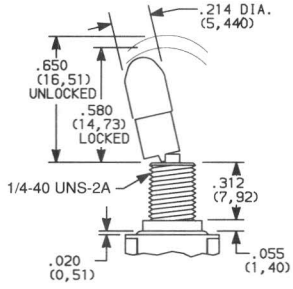
ACTUATOR

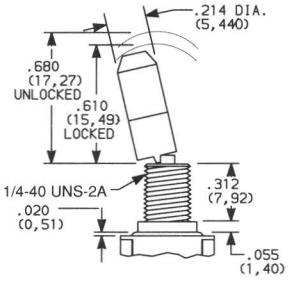


K LOCKING LEVER
K8 UNTHREADED

K1 LOCKING LEVER
K18 UNTHREADED

B





Keyway on right side.
Bushing code not required.

To prevent accidental actuation, toggles must be lifted before being actuated. When released, toggles again lock in place.

Please note:
Overtightening mounting nut may cause actuator to bind.

ACTUATOR CAP FINISH

KXX Actuators

OPTION CODE	ACTUATOR FINISH
(NONE)	NATURAL AL. – WITH NICKEL PLATED BUSHING* (STD.)
0	NATURAL AL. - WITH BLACK BUSHING*
2	BLACK ANODIZED AL.
3	RED ANODIZED AL.
7	BLUE ANODIZED AL.

Select actuator cap finish from chart. Place option code (if required) in appropriate box of ordering format.

* See BUSHING FINISH, below.

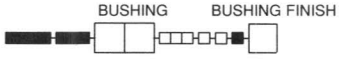
K, K1, K8, K18 Locking Positions



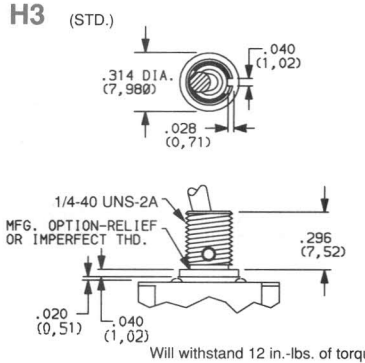
2 Pos. Lock

Keyway on right side.

BUSHING

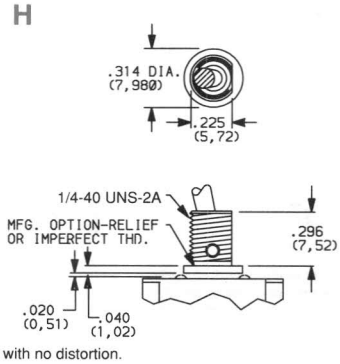


H3 (STD.)

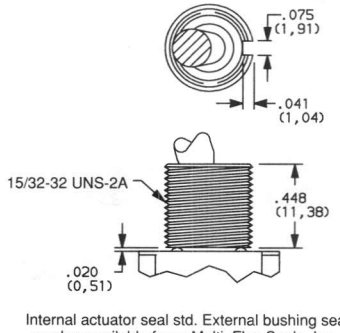


Will withstand 12 in.-lbs. of torque with no distortion.

H



CW SPLASHPROOF



Internal actuator seal std. External bushing seal washer available from: Multi–Flex Seals, Inc., Hackensack, NJ P/N MFS–60064

BUSHING FINISH

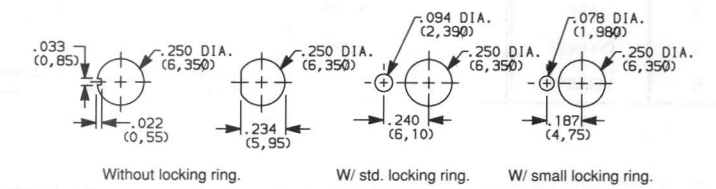
OPTION CODE	BUSHING FINISH
(NONE)	NICKEL (STD.)
2	BLACK OXIDE

Select bushing finish from chart. Place option code (if required) in appropriate box of ordering format. Black hardware is supplied when either black bushings or actuators are specified. All hardware is available separately, see catalog section H.

Hardware: Two mounting nuts, locking ring and lockwasher supplied standard with threaded bushings. Black hardware is supplied when either black bushings or actuators are specified. Optional mounting nut and locking ring styles and finishes available, see HARDWARE, catalog section H.

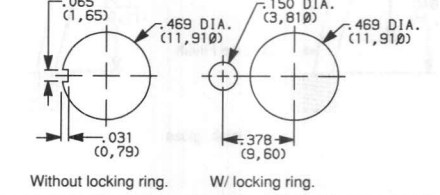
PANEL MOUNTING

1/4 INCH BUSHINGS



Without locking ring. W/ std. locking ring. W/ small locking ring.

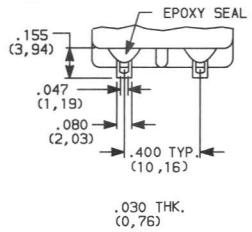
15/32 INCH BUSHINGS



Without locking ring. W/ locking ring.

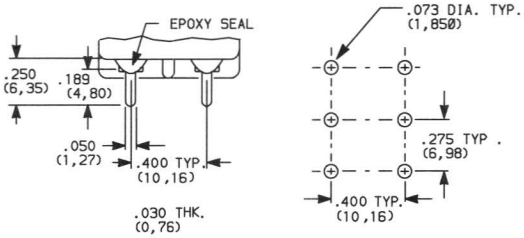
TERMINATIONS

Z



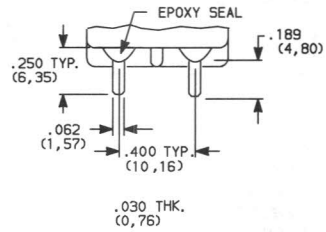
9201 MODEL ONLY

C



9201 MODEL ONLY

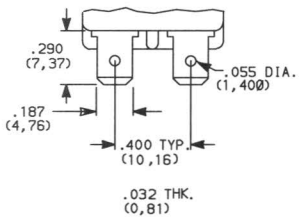
Z3 QUICK CONNECT



9201 MODEL ONLY

Mating quick connector available; order part no. 530100000.

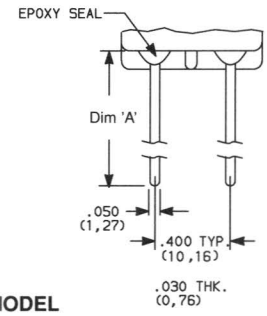
Z4 QUICK CONNECT



Only termination available with 9221 model.
Must be ordered with D seal option.
Mating quick connector available from:
Hollingsworth Solderless Terminals, Phoenixville, PA 19460 or
AMP Special Industries, Harrisburg, PA 17105

9201 and 9221

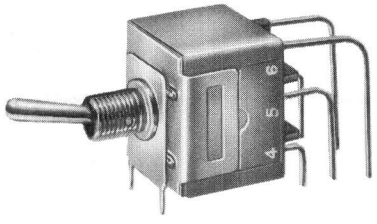
W-W1-W3-W4-W5 WIRE WRAP

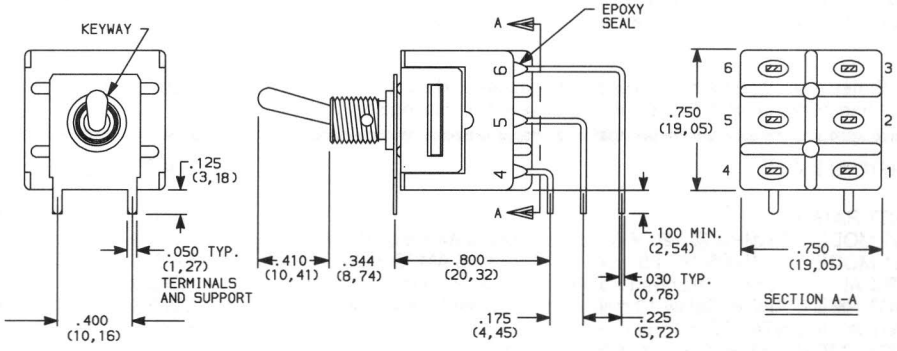


Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,48)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

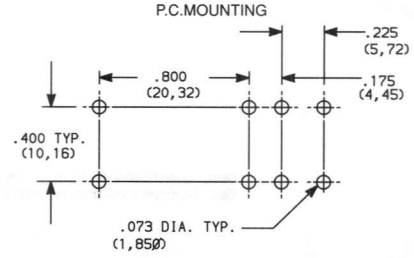
9201 MODEL ONLY

AV2





9201 MODEL ONLY



Term. bend radii and lead-in mfg. option
Term spacing greater than 3mm at all points
Actuator shown in pos. 1.

Part No. Shown: 9201SH3AV2QE

CONTACT MATERIAL

OPTION CODE	MODEL	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
Q	9201	SILVER [1,2]	SILVER [2]	POWER	6 AMPS @120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
	9221	SILVER CADMIUM OXIDE [3,4]	TIN [5]		10 AMPS @125 V AC OR 28 V DC; 5 AMPS @ 250 V AC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

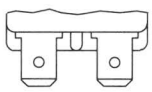
[1] END CONTACTS: Coin silver, silver plated.
[2] CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
[3] END CONTACTS: Silver cadmium oxide.
[4] CENTER CONTACT: Copper alloy, silver plated.
[5] ALL TERMINALS: Copper alloy, tin plated.

All 9000 Series models meet international dimensional and electrical requirements.

9221 model must be ordered with Z4 terminations and D seal option.

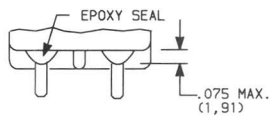
SEAL

D NO SEAL



Must be ordered with 9221 model and Z4 terminations.
Not available with any other terminations.

E



Must be ordered with all terminations except Z4.
Not available with 9221 model or Z4 terminations.

HOW TO ORDER

All available 9000 SERIES POWER TOGGLE SWITCH options are listed on page B-47, and are described on pages B-48 thru B-52. Switches with standard options are shown on page B-49. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All 9000 Series models meet international dimensional and electrical requirements.
Hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
9201 MODEL: 6 AMPS @ 120 V AC or 28 V DC; 3 AMPS @250 V AC.
9221 MODEL: 10 AMPS @ 125 V AC or 28 V DC; 5 AMPS @250 V AC.
ELECTRICAL LIFE: 25,000 make-and-break cycles at full load.
CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 2,500 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30°C to 85°C.
SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS–186E method 9 (1 hr. steam aging).

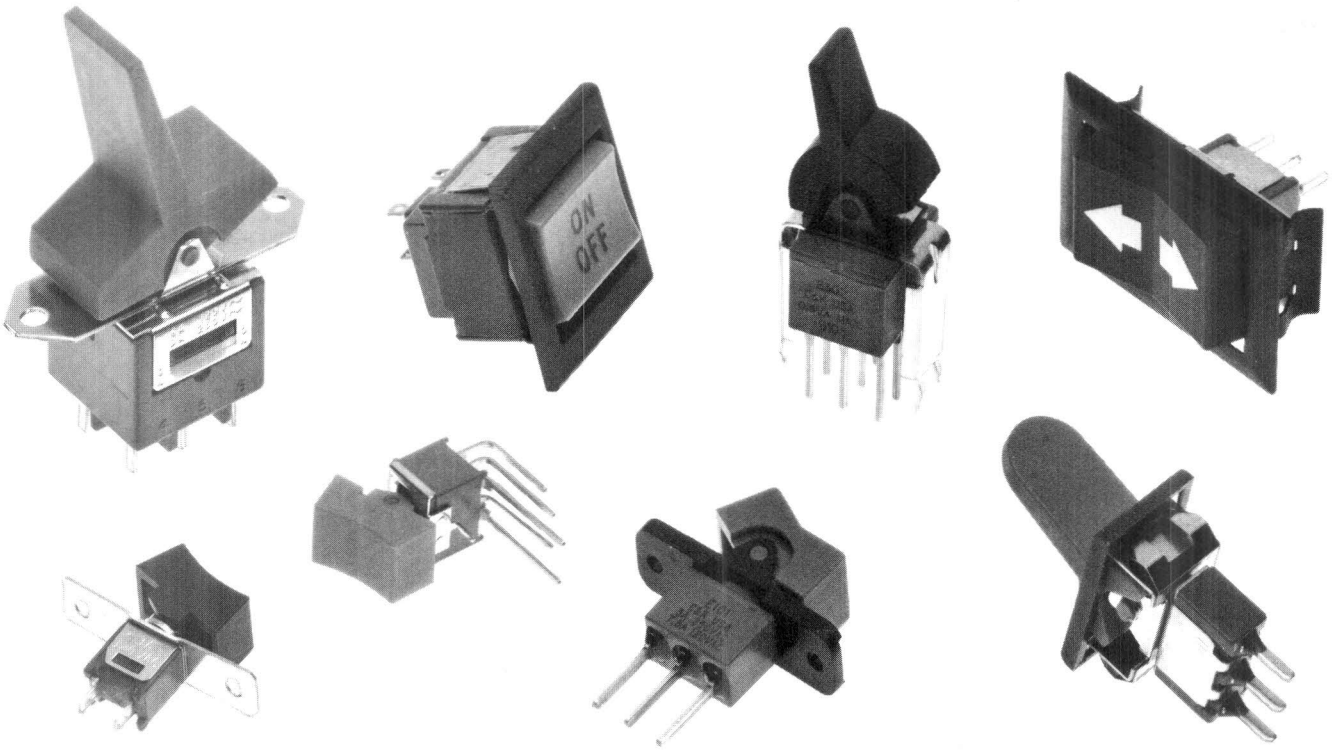
MATERIALS

CASE: Diallyl phthalate (DAP) (UL 94V-0).
ACTUATOR: Brass, chrome plated.
BUSHING: Brass or zinc, nickel plated.
HOUSING: Stainless steel.
SWITCH SUPPORT: Brass or steel, tin plated.
END CONTACTS:
9201 MODEL: Coin silver, silver plated.
9221 MODEL: Silver cadmium oxide.
CENTER CONTACTS: Copper alloy, silver plated.
ALL TERMINALS:
9201 MODEL: Copper alloy, silver plated.
9221 MODEL: Copper alloy, electrotin plated.
TERMINAL SEAL: Epoxy
HARDWARE: Nut & Locking ring – Brass, nickel plated.
Lockwasher – Steel, nickel plated.

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

SECTION C

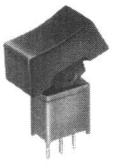
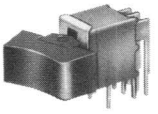
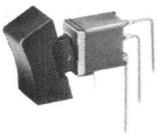
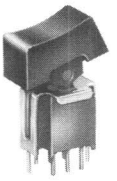
ROCKER AND LEVER HANDLE SWITCHES



ET Series	Sealed Tiny Rocker Switches	C-2 thru C-6
T Series	Tiny Rocker Switches	C-7 thru C-11
E Series	Sealed Anti-Static Rocker and Lever Handle Switches	C-12 thru C-26
7000 Series	Rocker and Lever Handle Switches	C-27 thru C-48
5000 Series	Illuminated Rocker Switches	C-49 thru C-53
9000 Series	Power Rocker and Lever Handle Switches	C-54 thru C-60

Sealed* Tiny Rocker Switches

* Process sealed – withstands soldering and cleaning processes.

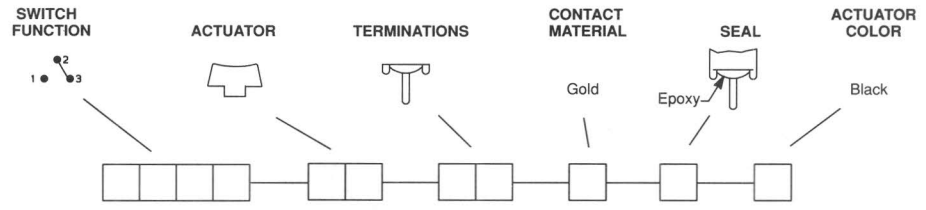





models available, see page C-3.

Easy Build-A-Switch:

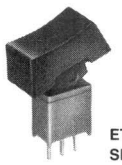
Below is a complete listing of available options for ET SERIES SEALED TINY ROCKER SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page C-3; all available options are shown and described on pages C-3 thru C-6. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-6. Hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.

C

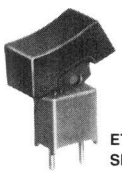


ET01	J1	A	B	E	1
ET02	J6	AV	G		2
ET03		C	K		3
ET05		V3	L		4
ET07		W	M		5
ET08			Q		6
ET21					7
ET23					8
ET24					9
ET25					
ET27					
ET28					

SWITCHES WITH STANDARD OPTIONS

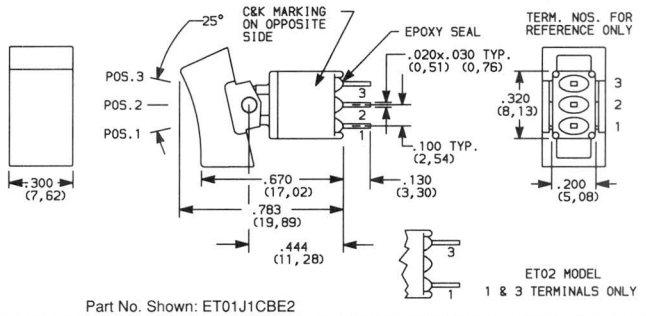


ET01
SPDT

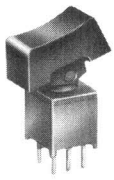


ET02
SPST

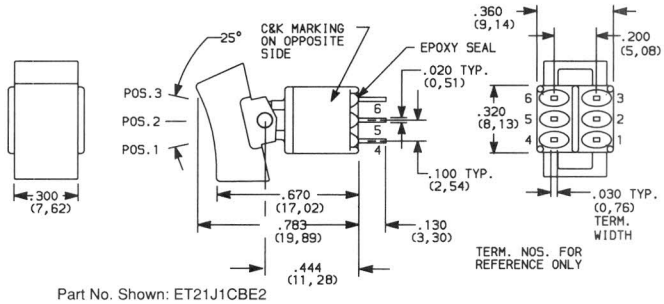
SPST and SPDT



Part No. Shown: ET01J1CBE2



DPDT



Part No. Shown: ET21J1CBE2

C

SWITCH FUNCTION

NO. POLES	MODEL+ NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	ET01	ON	NONE	ON	2-3	OPEN	2-1	2 (COMM), 1, 3 — SPDT
	ET03	ON	OFF	ON				
	ET05	MOM.	OFF	MOM.				
	ET07	ON	OFF	MOM.				
	ET08	ON	NONE	MOM.				
	ET02	OFF	NONE	ON	OPEN	N/A	3-1	SPST 1, 3
DP	ET21	ON	NONE	ON	2-3,5-6	OPEN	2-1,5-4	2 (COMM) 5, 1, 3, 4, 6 — DPDT
	ET23	ON	OFF	ON				
	ET25	MOM.	OFF	MOM.				
	ET27	ON	OFF	MOM.				
	ET28	ON	NONE	MOM.				
	ET24**	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	

MOM. = MOMENTARY

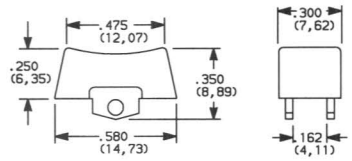
+ All models UL with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

** Wiring for 3-way switch, see page X.

ACTUATOR

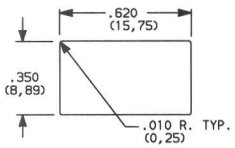
ACTUATOR ACTUATOR COLOR

J1

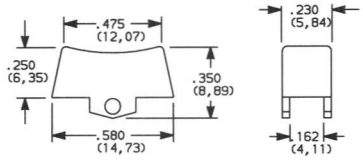


Std. with all models except ET0X with A terminations.

PANEL MOUNTING – J1

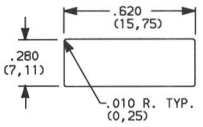


J6



Std. with ET0X models with A terminations.

PANEL MOUNTING – J6



ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

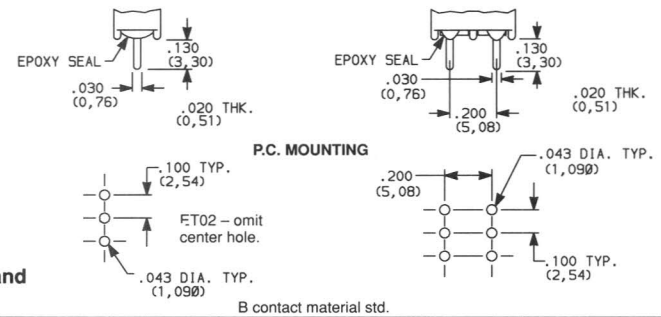
Select actuator color from chart. Place option code in appropriate box of ordering format.
Finish: matte.
Custom actuator markings and legends available, consult factory. Internal o-ring actuator seal std. Actuators are available separately, see catalog section H.

C

TERMINATIONS

C (STD.)

SP DP

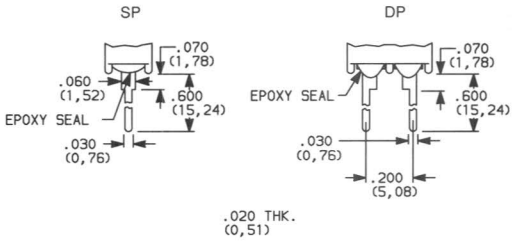


SP and DP

B contact material std.

W WIRE WRAP

SP DP



SP and DP

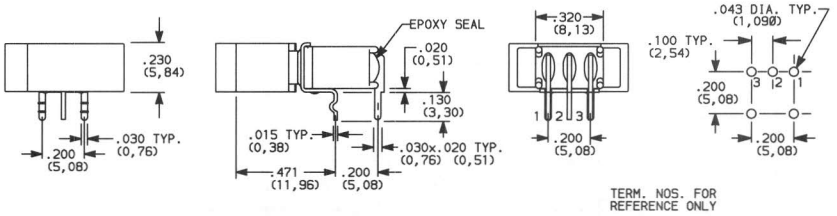
B contact material std.

A



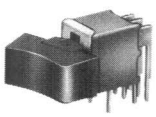
SPDT

Actuator shown in pos.1.
B contact material std.
J6 actuator std. only on ET0X models with A terminations.
Not avail. with ET02 model.



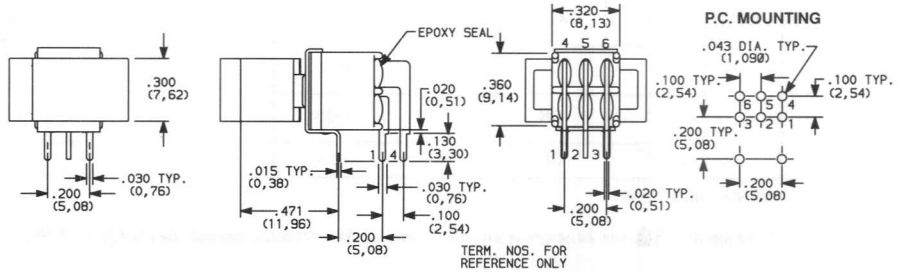
Part No. Shown: ET01J6ABE2

A



DPDT

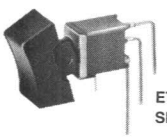
Actuator shown in pos.1.
B contact material std.
J1 actuator std. on ET2X models with A terminations.



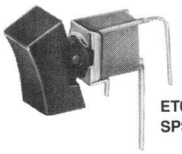
Part No. Shown: ET21J1ABE2

TERMINATIONS

AV

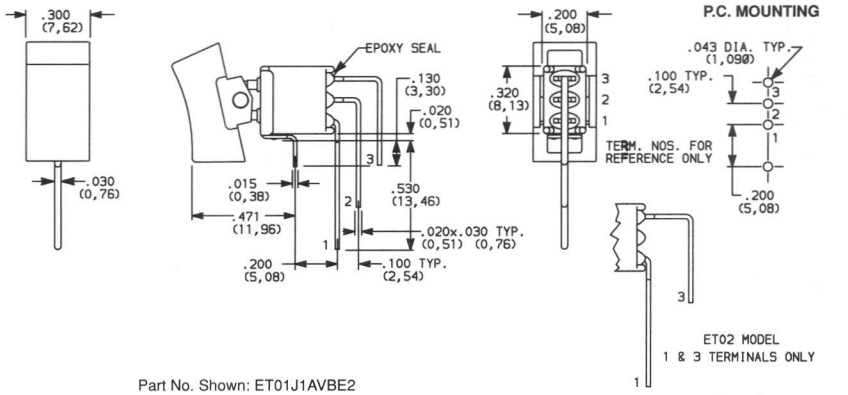


ET01
SPDT



ET02
SPST

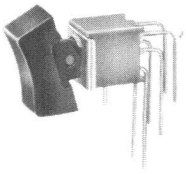
SPST and SPDT



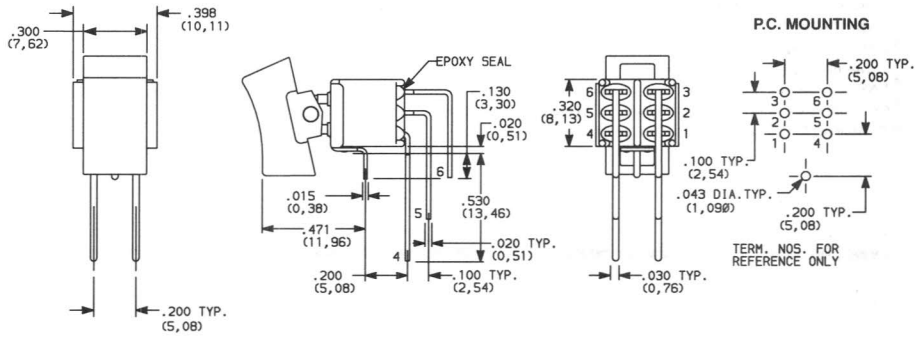
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET01J1AVBE2

AV



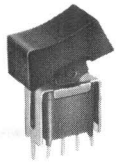
DPDT



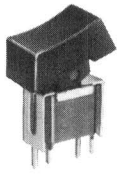
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET21J1AVBE2

V3

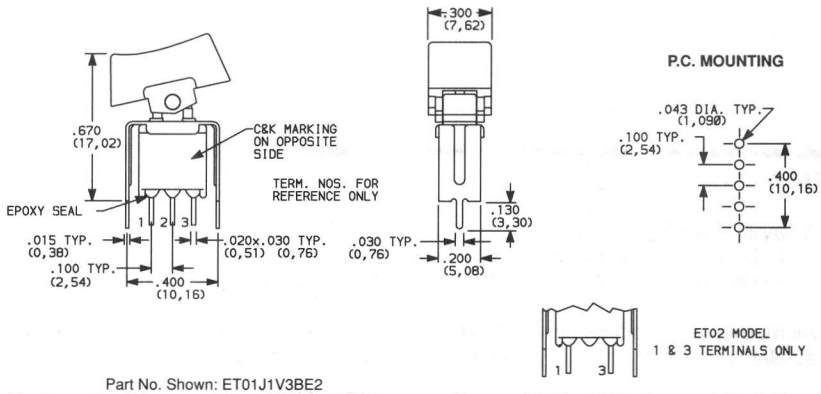


ET01
SPDT



ET02
SPST

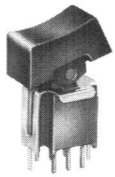
SPST and SPDT



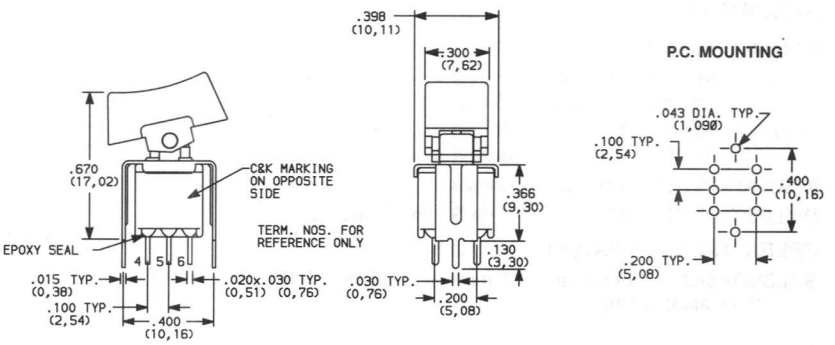
Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET01J1V3BE2

V3



DPDT



Actuator shown in pos.1.
B contact material std.

Part No. Shown: ET21J1V3BE2

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	ETX1 MODELS: 3 AMPS @120 V AC OR 28 V DC. ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	ETX1 MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 3 AMPS @120 V AC OR 28 V DC. ALL OTHER MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 2 AMPS @ 120 V AC OR 28 V DC.
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

C

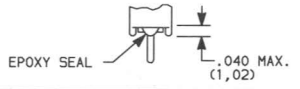
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models with all options when ordered with G, L, M or Q contact material. See pages C-3 and VIII.

B contact material std. with all terminations.

SEAL

E (STD.)



HOW TO ORDER

All available ET SERIES SEALED TINY ROCKER SWITCH options are listed on page C-2, and are described on pages C-3 thru C-6. Switches with standard options are shown on page C-3. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. models available, see page C-3. Actuators are available separately, see catalog section H.

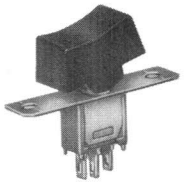
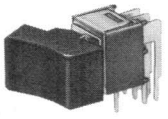
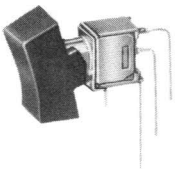
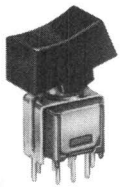
SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max. (B contact mat'l).
ELECTRICAL LIFE: ETX1 MODELS: 60,000 make-and-break cycles at full load. All other models, 30,000 cycles.
CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30°C to 85°C.
SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).
ACTUATOR: Nylon, black std. Internal o-ring seal standard with all actuators.
SWITCH SUPPORT: Brass, tin plated.
CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact mat'l).
TERMINAL SEAL: Epoxy.

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

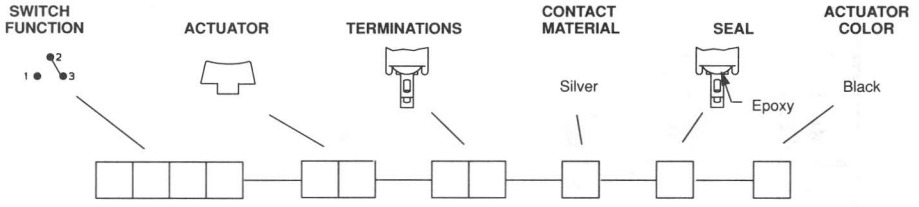





models available, see page C-8.

Easy Build-A-Switch:

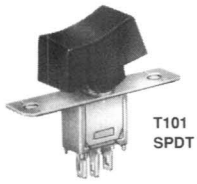
Below is a complete listing of available options for T SERIES TINY ROCKER SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page C-8; all available options are shown and described on pages C-8 thru C-11. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-11. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

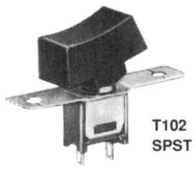
C



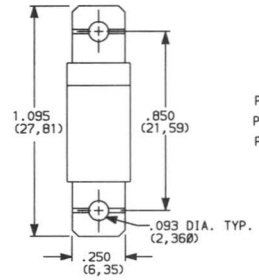
T101	J1	A	B	E	1
T102	J6	AV	G		2
T103		C	K		3
T105		V3	L		4
T107		W	M		5
T108		Z	Q		6
T201					7
T203					8
T205					9
T207					
T208					
T211					

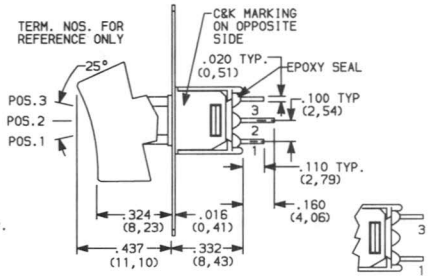
SWITCHES WITH STANDARD OPTIONS

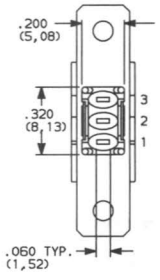




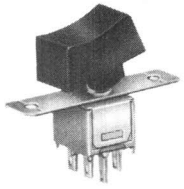
SPST and SPDT



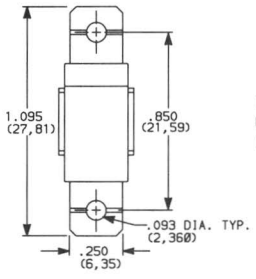


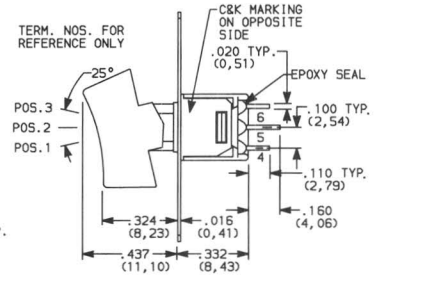


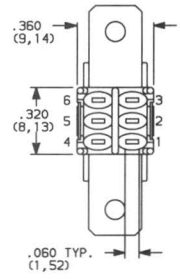
Part No. Shown: T101J1ZQE2



DPDT







Part No. Shown: T201J1ZQE2

SWITCH FUNCTION

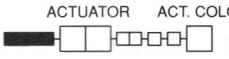
NO. POLES	MODEL* NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	T101	ON	NONE	ON	2-3	OPEN	2-1	2 (COMM), 1, 3 — SPDT
	T103	ON	OFF	ON				
	T105	MOM.	OFF	MOM.				
	T107	ON	OFF	MOM.				
	T108	ON	NONE	MOM.				
	T102	OFF	NONE	ON	OPEN	N/A	3-1	1, 3 — SPST
DP	T201	ON	NONE	ON	2-3,5-6	OPEN	2-1,5-4	2 (COMM), 5, 1, 3, 4, 6 — DPDT
	T203	ON	OFF	ON				
	T205	MOM.	OFF	MOM.				
	T207	ON	OFF	MOM.				
	T208	ON	NONE	MOM.				
	T211**	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	

MOM. = MOMENTARY

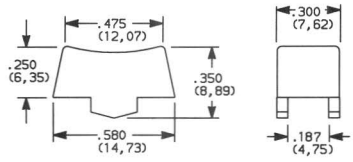
* All models UL with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

** Wiring for 3-way switch, see page X.

ACTUATOR

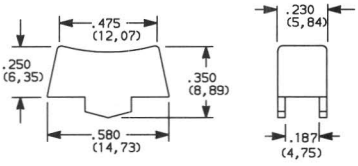


J1



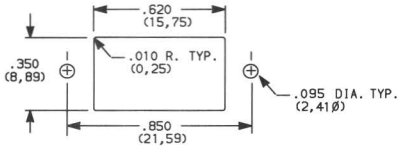
Std. with all models except T10X with A terminations.

J6

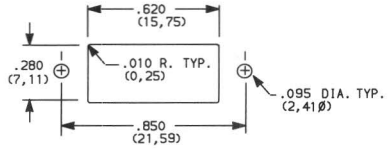


Std. on all T10X models with A terminations.

PANEL MOUNTING – J1



PANEL MOUNTING – J6



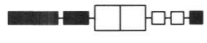
ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

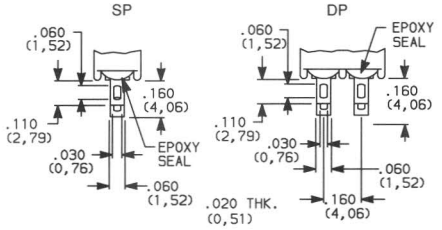
Select actuator color from chart. Place option code in appropriate box of ordering format.
Finish: matte.
Custom actuator markings and legends available, consult factory.

C

TERMINATIONS



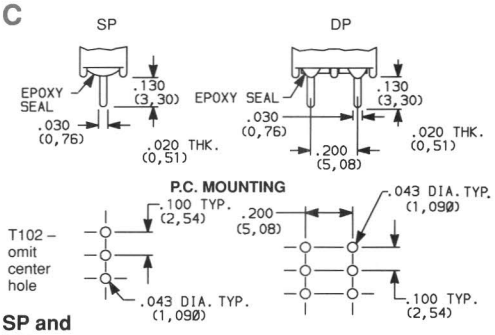
Z (STD.)



SP and DP

Q contact material std.
Not available with K, L, or M contact material.

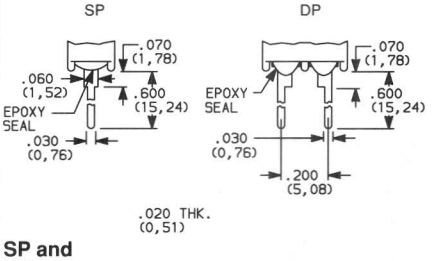
C



SP and DP

Q contact material std.

W WIRE WRAP

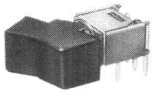


SP and DP

B contact material std.

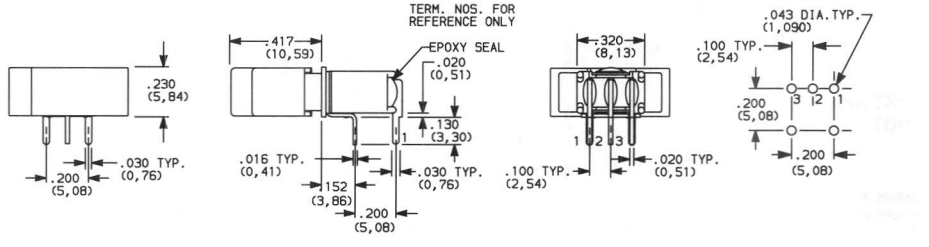
Models with Z, C or W terminations supplied with panel mounting bracket standard, as shown on page C-8.

A



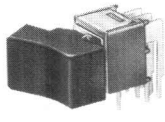
SPDT

Actuator shown in pos.1.
B contact material std.
J6 actuator std. only on T10X models with A terminations.
Not avail. with T102 model.



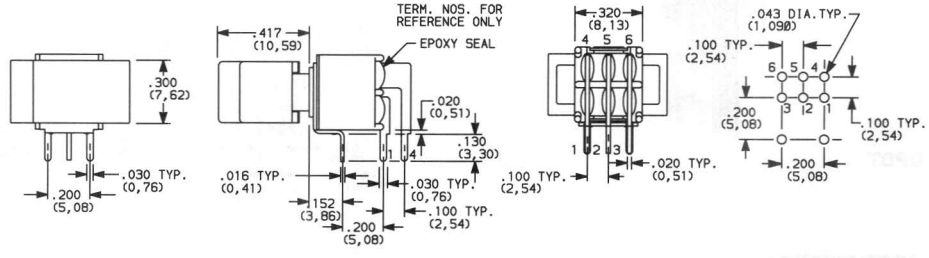
Part No. Shown: T101J6ABE2

A



DPDT

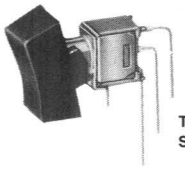
Actuator shown in pos.1.
B contact material std.
J1 actuator std. on T2XX models with A terminations.



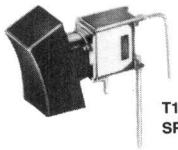
Part No. Shown: T201J1ABE2

TERMINATIONS

AV

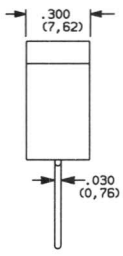


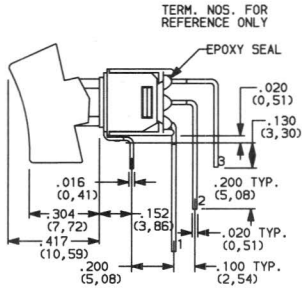
T101
SPDT



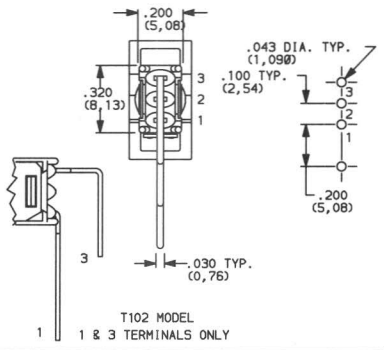
T102
SPST

SPST and SPDT





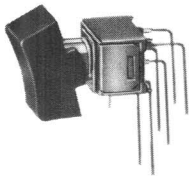
P.C. MOUNTING



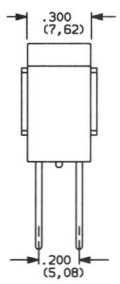
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.

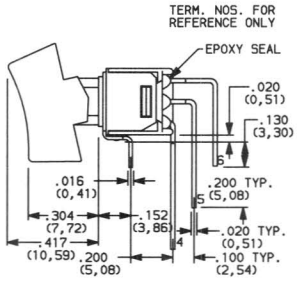
Part No. Shown: T101J1AVBE2

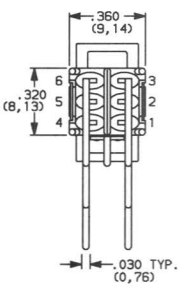
AV



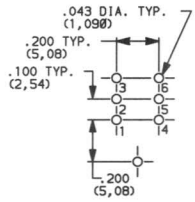
DPDT







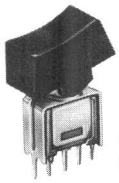
P.C. MOUNTING



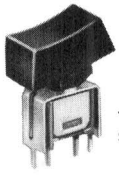
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.

Part No. Shown: T201J1AVBE2

V3

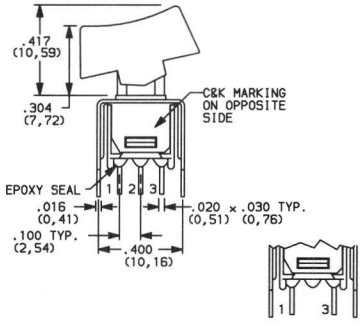


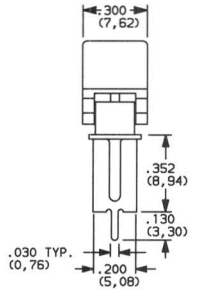
T101
SPDT



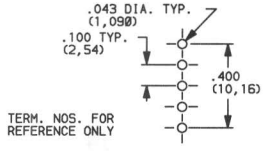
T102
SPST

SPST and SPDT





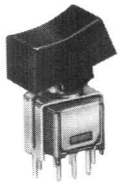
P.C. MOUNTING



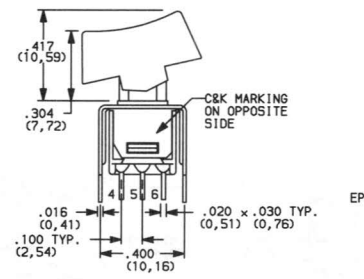
Actuator shown in pos.1.
B contact material std.

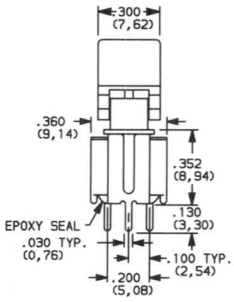
Part No. Shown: T101J1V3BE2

V3

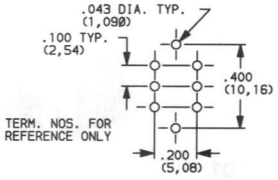


DPDT





P.C. MOUNTING



Actuator shown in pos.1.
B contact material std.

Part No. Shown: T201J1V3BE2

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	TX01 MODELS: 3 AMPS @120 V AC OR 28 V DC.
M		TIN-LEAD [6]		ALL OTHER MODELS: 2 AMPS @ 120 V AC OR 28 V DC.
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	TX01 MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 3 AMPS @120 V AC OR 28 V DC.
L		TIN-LEAD [6]		ALL OTHER MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 2 AMPS @ 120 V AC OR 28 V DC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

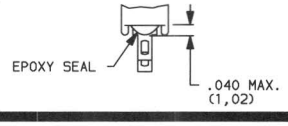
All models with all options when ordered with G, L, M or Q contact material.
See pages C-8 and VIII.

B contact material std. with A, AV, V3, W terminations.
Q contact material std. with Z, C terminations.

C

SEAL

E (STD.)



HOW TO ORDER

All available T SERIES TINY ROCKER SWITCH options are listed on page C-7, and are described on pages C-8 thru C-11. Switches with standard options are shown on page C-8. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page C-8.

Hardware: two each – mounting screws, nuts, lockwashers and standoffs for 1/8 in. thk. panel are supplied standard on switches with panel mounting bracket. Hardware for other panel thicknesses also available. Hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING: TX01 MODELS: 3 AMPS @120 V AC or 28 V DC. All other models: 2 AMPS @120 V AC or 28 V DC (Q contact mat'l).

ELECTRICAL LIFE: TX01 MODELS: 60,000 make-and-break cycles at full load. All other models, 30,000 cycles.

CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

MATERIALS

CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP), (UL 94V-0).

ACTUATOR: Nylon, black std.

BUSHING: Brass, nickel plated..

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass, tin plated.

MOUNTING BRACKET: Stainless steel.

END CONTACTS: Coin silver, silver plated (Q contact mat'l).

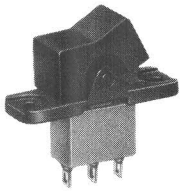
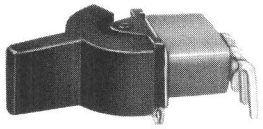
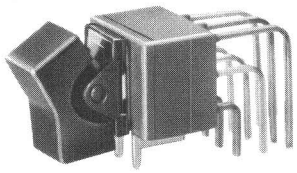
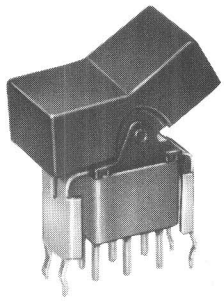
CENTER CONTACTS & TERMINALS: Copper alloy, silver plated (Q contact mat'l).

TERMINAL SEAL: Epoxy.

HARDWARE: Nut, Screw, & Lockwasher – Stainless steel. Standoff – Nylon std. Aluminum available, consult factory.

Sealed* Anti-Static Rocker and Lever Handle Switches

* Process sealed – withstands soldering and cleaning processes.

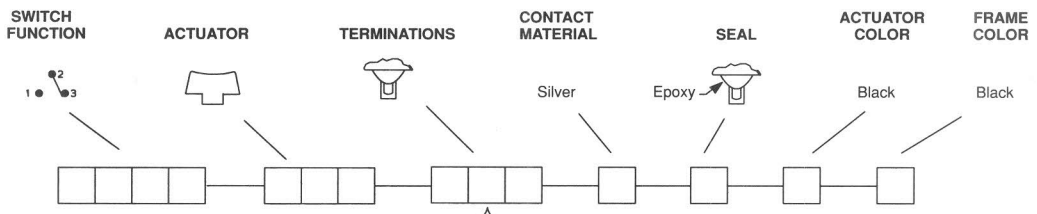





models available, see page C-14.

Easy Build-A-Switch:

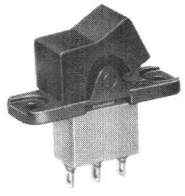
Below is a complete listing of available options for E SERIES SEALED ANTI-STATIC ROCKER AND LEVER HANDLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page C-13; all available options are shown and described on pages C-14 thru C-26. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-26. Hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.

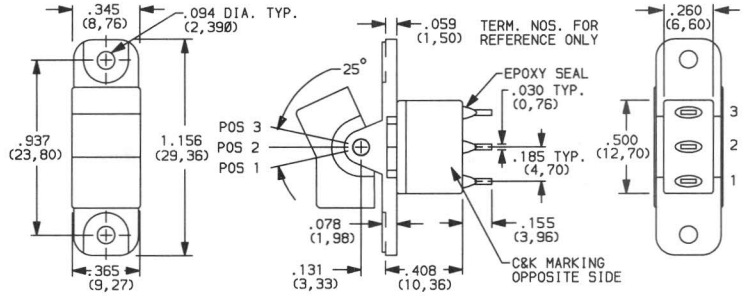
C



SWITCH FUNCTION	ACTUATOR	TERMINATIONS	CONTACT MATERIAL	SEAL	ACTUATOR COLOR	FRAME COLOR
E101	J1	A	V61	B	E	1	(NONE)
E103	J2	A3	V71	G		2	1
E105	J3	AV2	V81	K		3	2
E107	J4	AV3	V91	L		4	C
E108	J5	AV5	W	M		5	S
E201	J11	AW	W1	Q		6	
E203	J21	AW1	W3			7	
E205	J50	AW3	W4			8	
E207	J54	AW4	W5			9	
E208	J60	AW5	Z				
E211	J64	C	Z3				
E213	J90	V2					
E215	J94	V3					
E301		V4					
E303		V5					
E305		V6					
E307		V7					
E308		V8					
		V9					
		V21					
		V31					
		V41					
		V51					
		V54					
		V55					

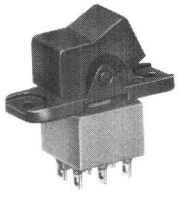
SWITCHES WITH STANDARD OPTIONS

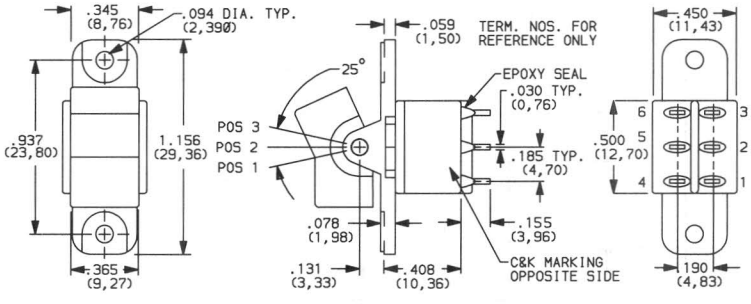




SPDT

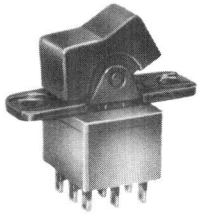
Part No. Shown: E101J1ZBE2

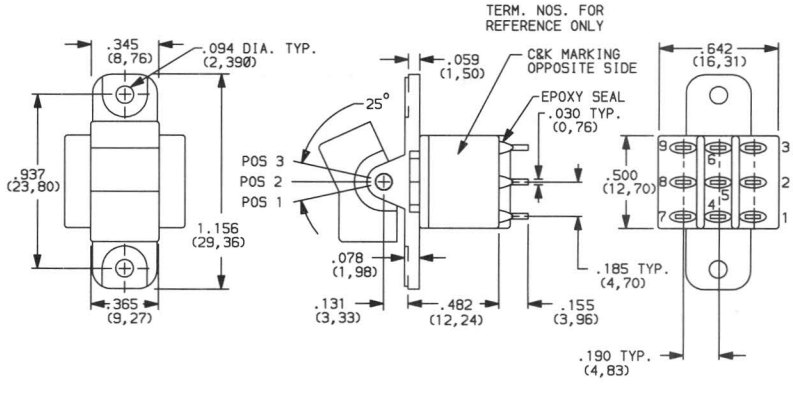




DPDT

Part No. Shown: E201J1ZBE2

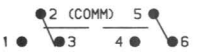
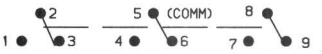




3PDT

Part No. Shown: E301J1ZBE2

SWITCH FUNCTION

NO. POLES	MODEL+ NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	E101	ON	NONE	ON	2-3	OPEN	2-1	 SPDT
	E103	ON	OFF	ON				
	E105	MOM.	OFF	MOM.				
	E107	ON	OFF	MOM.				
	E108	ON	NONE	MOM.				
DP	E201	ON	NONE	ON	2-3,5-6	OPEN	2-1,5-4	 DPDT
	E203	ON	OFF	ON				
	E205	MOM.	OFF	MOM.				
	E207	ON	OFF	MOM.				
	E208	ON	NONE	MOM.				
	E211**	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	
	E213**	ON	ON	MOM.				
	E215**	MOM.	ON	MOM.				
3P	E301	ON	NONE	ON	2-3,5-6,8-9	OPEN	2-1,5-4,8-7	 3PDT
	E303	ON	OFF	ON				
	E305	MOM.	OFF	MOM.				
	E307	ON	OFF	MOM.				
	E308	ON	NONE	MOM.				

MOM. = MOMENTARY

+ All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

** Wiring for 3-way switch, see page X.

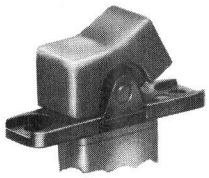
Sealed* Anti-Static Rocker and Lever Handle Switches

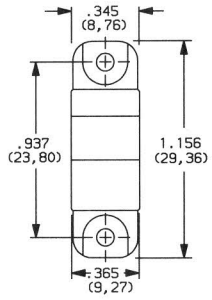
* Process sealed – withstands soldering and cleaning processes.

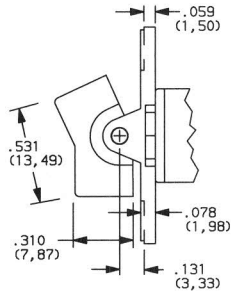
ACTUATORS – PANEL MOUNT

ACTUATOR ACT. COLOR

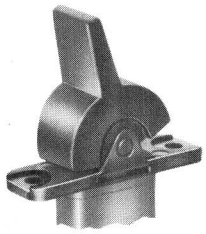
J1 (STD.)

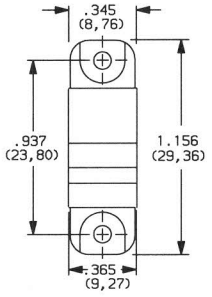


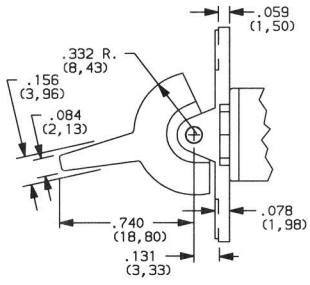




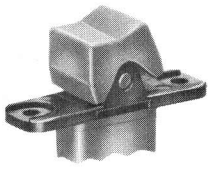
J2

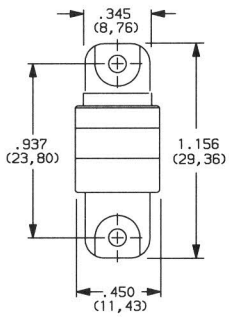


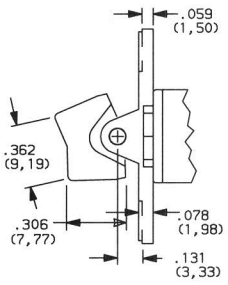




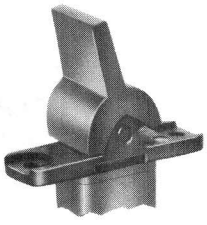
J54

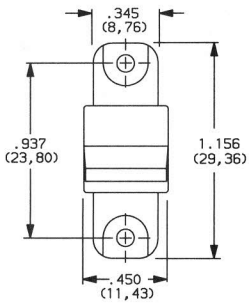


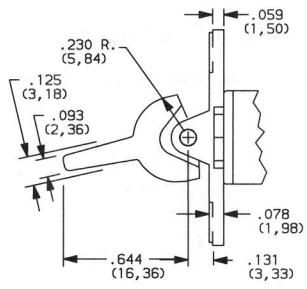




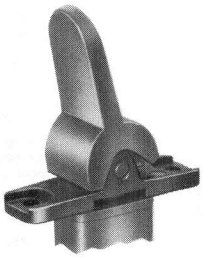
J64

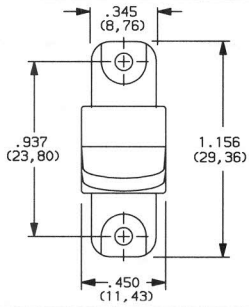


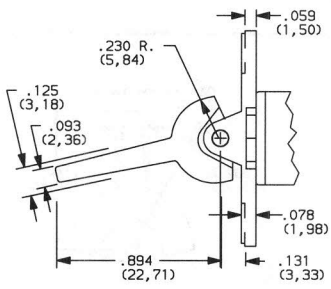




J94







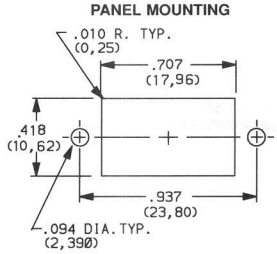
ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

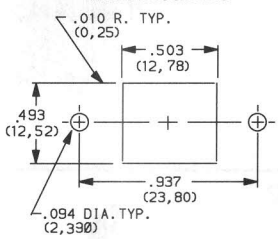
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-26. Internal o-ring actuator seal std. Actuators and hardware are available separately, see catalog section H.

Available with Z, C, Z3 or W-W5 terminations.

J1 – J2 PANEL MOUNTING

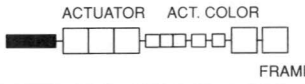


J54 – J64 – J94 PANEL MOUNTING



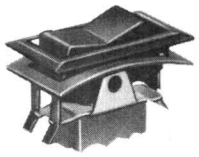
C

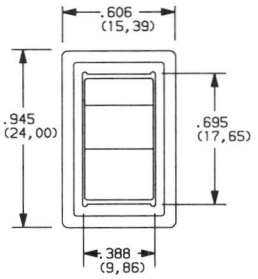
ACTUATORS – REAR MOUNT

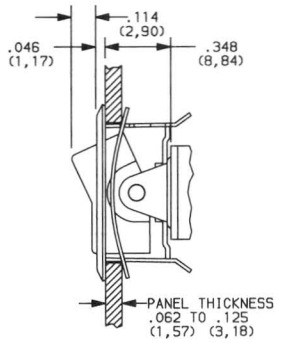


J11

NEW



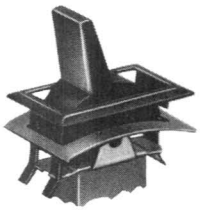


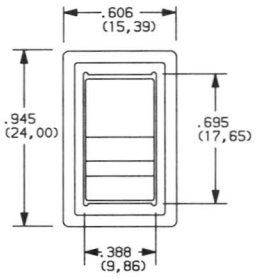


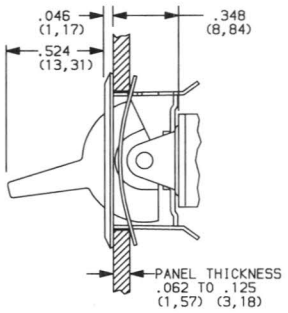
Note: This option has reduced anti-static capability.

J21

NEW







Note: This option has reduced anti-static capability.

ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

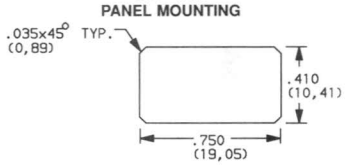
FRAME COLOR

OPTION CODE	FRAME COLOR
1	WHITE
2	BLACK (std.)
C	BRIGHT CHROME
S	SATIN CHROME

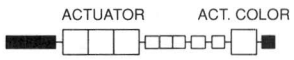
Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte, frame finish: gloss. Custom actuator markings and legends available, consult factory. Internal o-ring actuator seal std. Frames are available separately, see catalog section H.

Available with Z, C, Z3 or W-W5 terminations.

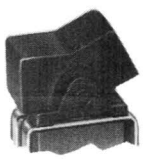
J11 – J21
PANEL MOUNTING

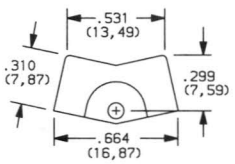


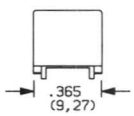
ACTUATORS – P.C. MOUNT



J1

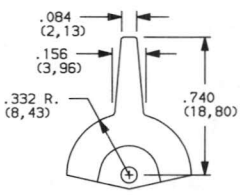


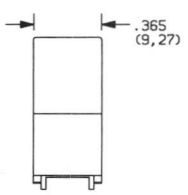




J2







ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

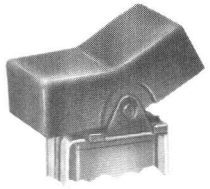
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Internal o-ring actuator seal std. Actuators available separately, see catalog section H.

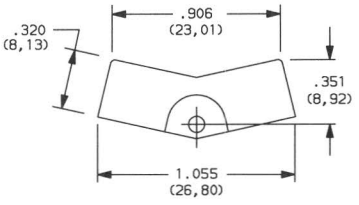
Available with A, A3, AW-AW5, AV2-AV5, V2-V91 terminations.

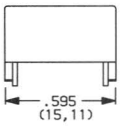
ACTUATORS – P.C. MOUNT

ACTUATOR ACT. COLOR

J3

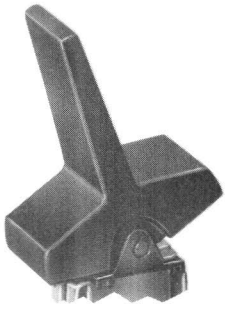


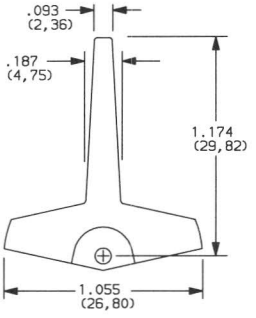


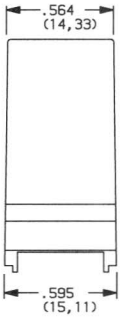


J4

NEW

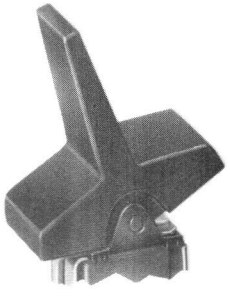


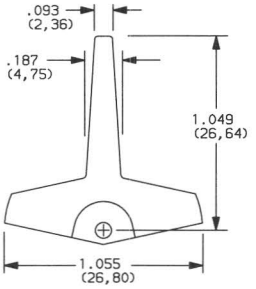


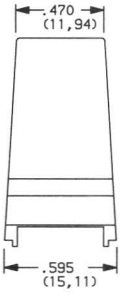


J5

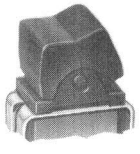
NEW

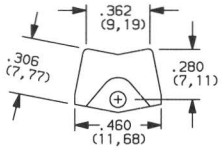


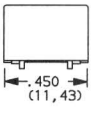




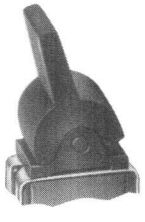
J50

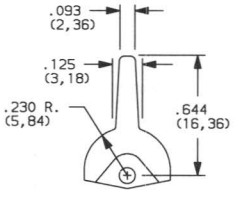


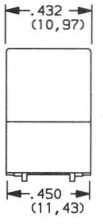




J60

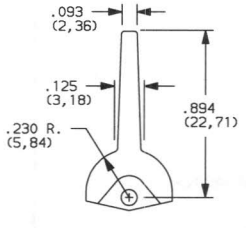


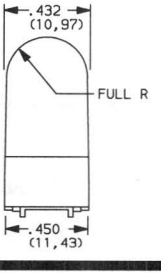




J90







ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select actuator color from chart. Place option code in appropriate box of ordering format.
Finish: matte. Custom actuator markings and legends available, consult factory. Internal o-ring actuator seal std. Actuators are available separately, see catalog section H.

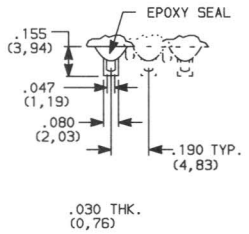
J3, J4, J5 actuators available with AV2-AV5, V2-V91 terminations. Some permissible actuator/termination combinations may lack clearance between actuator and P.C. board, and care must be exercised to accommodate this condition.

J50, J60, J90 actuators available with A, A3, AW-AW5, AV2-AV5, V2-V91 terminations.

C

TERMINATIONS

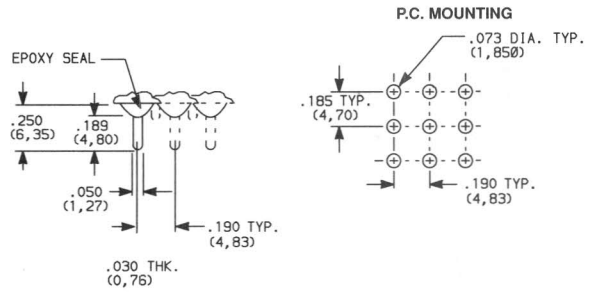
Z (STD.)



SPDT thru **3PDT**

B contact material std.
Available actuators, see pages C-15 and C-16.
Not avail. with K, L, or M contact material.

C

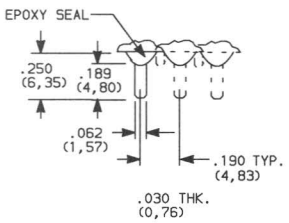


SPDT thru **3PDT**

B contact material std.
Available actuators, see pages C-15 and C-16.

C

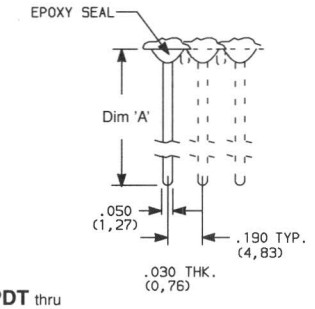
Z3 QUICK CONNECT



SPDT thru **3PDT**

B contact material std.
Available actuators, see pages C-15 and C-16.
Mating quick connect available; order P/N 530100000.

W-W1-W3-W4-W5 WIRE WRAP

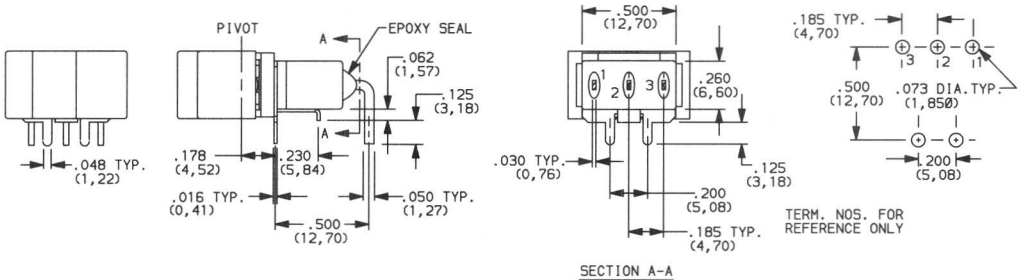


Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,48)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

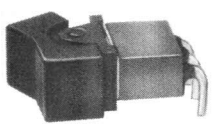
SPDT thru **3PDT**

B contact material std.
Available actuators, see pages C-15 and C-16.

A



Part No. Shown: E101J1ABE2



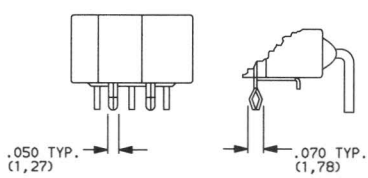
A

SPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Note: P.C. pattern must clear switch support leg.
Available actuators, see pages C-16 and C-17.

A3 SNAP-IN

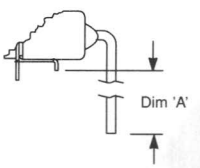
NEW



SNAP-IN DESIGN RETAINS SWITCH.

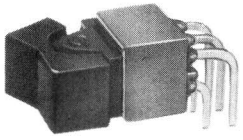
AW-AW1-AW3-AW4-AW5 EXTENDED

NEW



Option	Dim 'A'
AW	.44 (11,2)
AW1	.66 (16,8)
AW3	.14 (3,6)
AW4	.77 (19,6)
AW5	1.02 (25,9)

TERMINATIONS



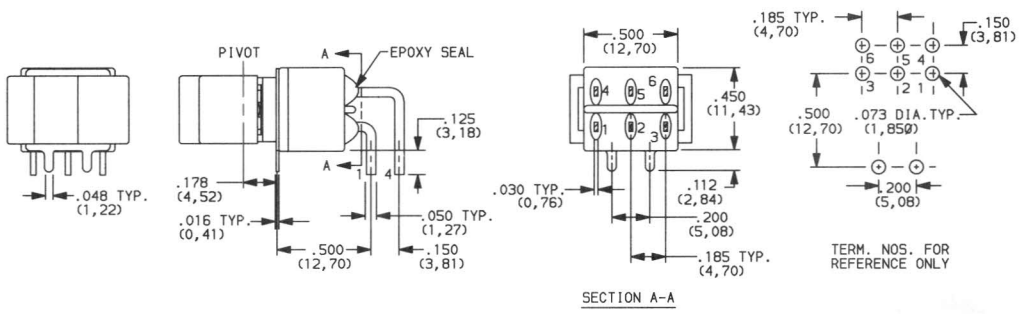
A

DPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

A

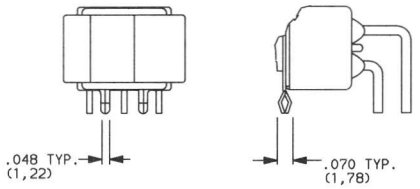
P.C. MOUNTING



Part No. Shown: E201J1ABE2

A3 SNAP-IN

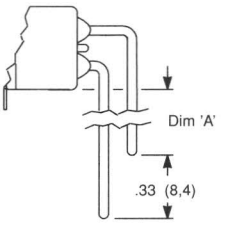
NEW



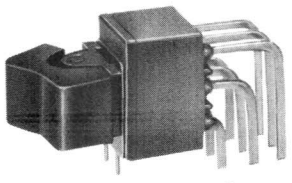
SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW4-AW5 EXTENDED

NEW



Option	Dim 'A'
AW	.21 (5,3)
AW1	.42 (10,7)
AW4	.52 (13,2)
AW5	.76 (19,3)



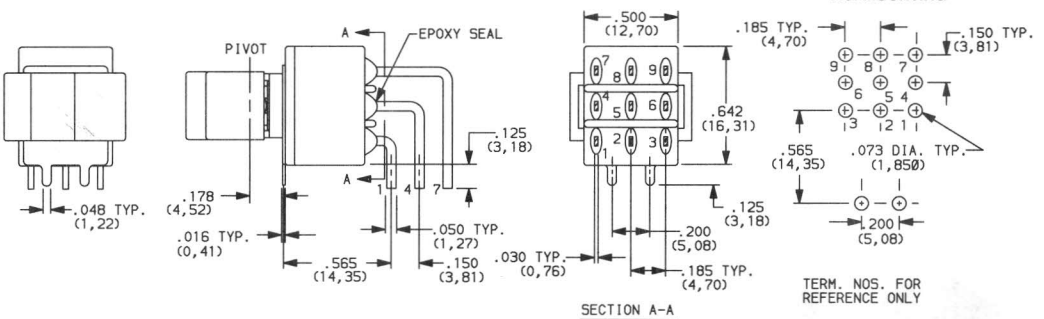
A

3PDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

A

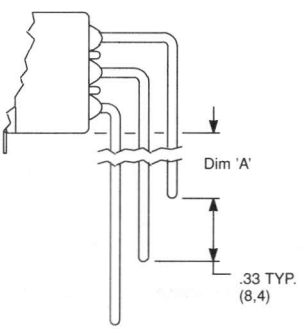
P.C. MOUNTING



Part No. Shown: E301J1ABE2

AW4-AW5 EXTENDED

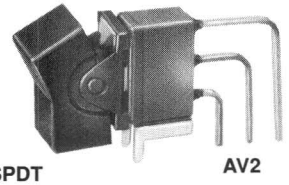
NEW



Option	Dim 'A'
AW4	.18 (4,6)
AW5	.42 (10,7)

TERMINATIONS

C

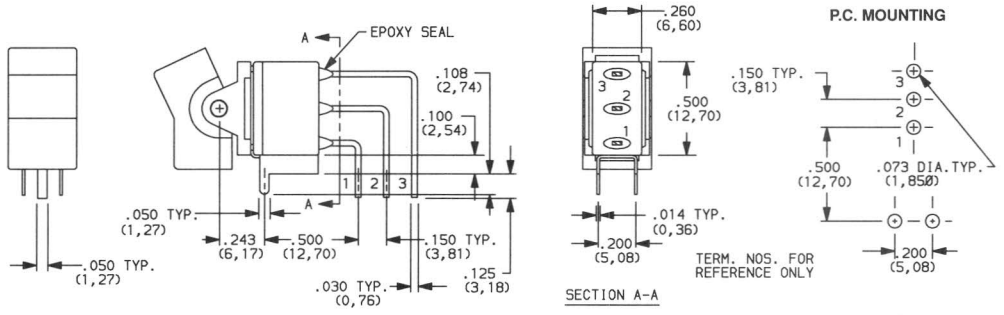


SPDT

AV2

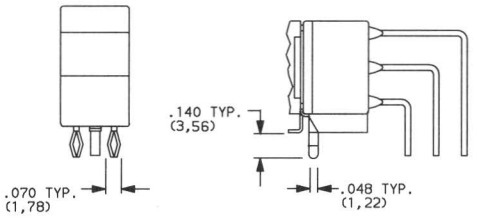
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

AV2



Part No. Shown: E101J1AV2BE2

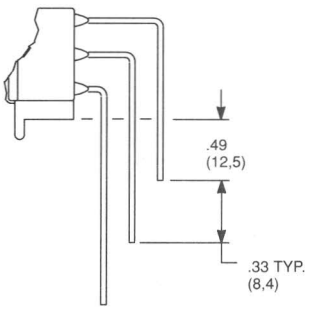
AV3 SNAP-IN

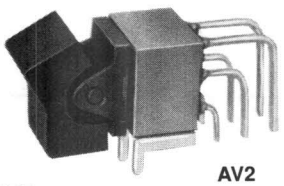


SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED

NEW



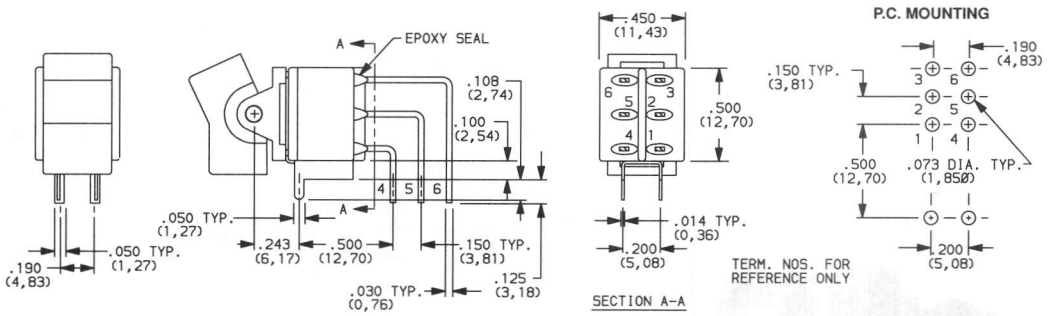


DPDT

AV2

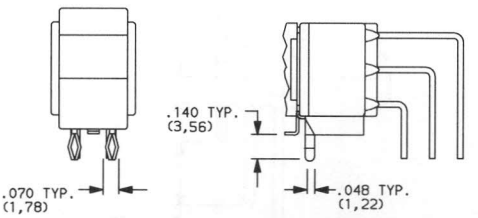
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

AV2



Part No. Shown: E201J1AV2BE2

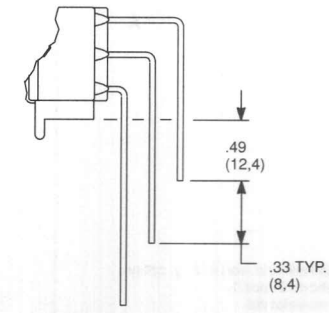
AV3 SNAP-IN



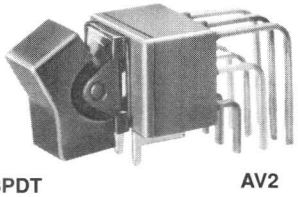
SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED

NEW

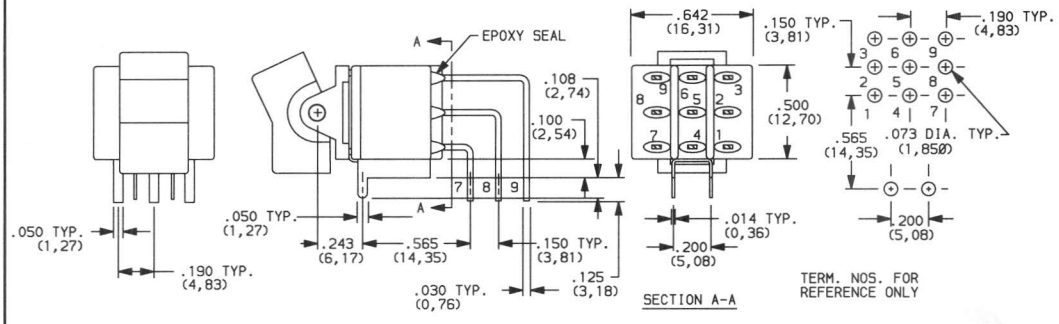


TERMINATIONS



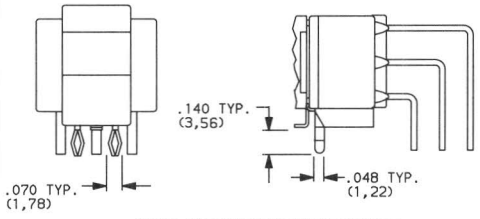
3PDT AV2

AV2



Part No. Shown: E301J1AV2BE2

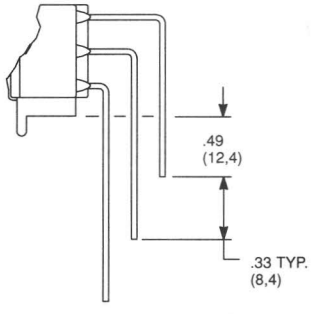
AV3 SNAP-IN



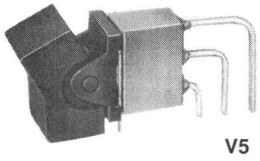
SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED

NEW

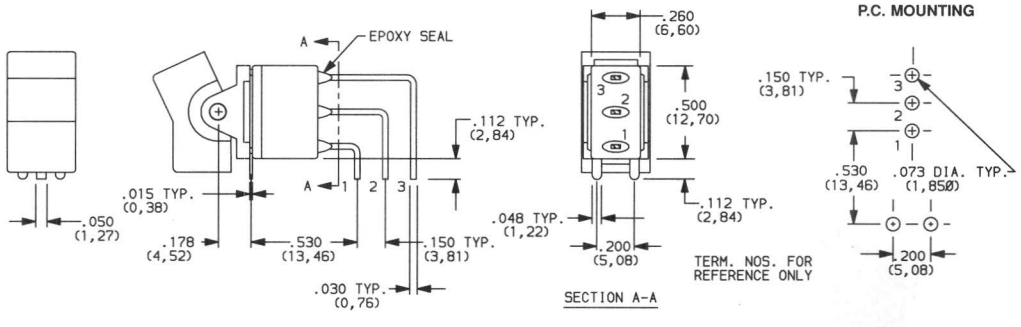


Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.



SPDT V5

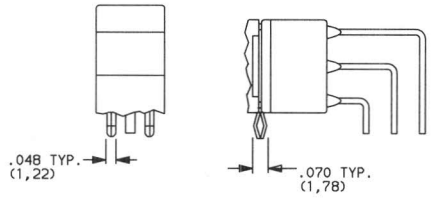
V5



Part No. Shown: E101J1V5BE2

V51 SNAP-IN

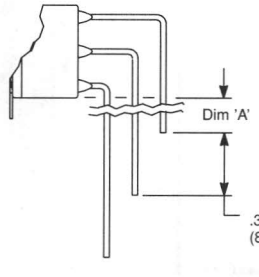
NEW



SNAP-IN DESIGN RETAINS SWITCH.

V54-V55 EXTENDED

NEW

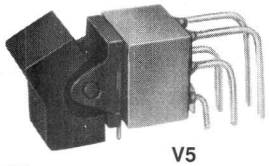


Option	Dim 'A'
V54	.18 (4,6)
V55	.42 (10,7)

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

TERMINATIONS

C

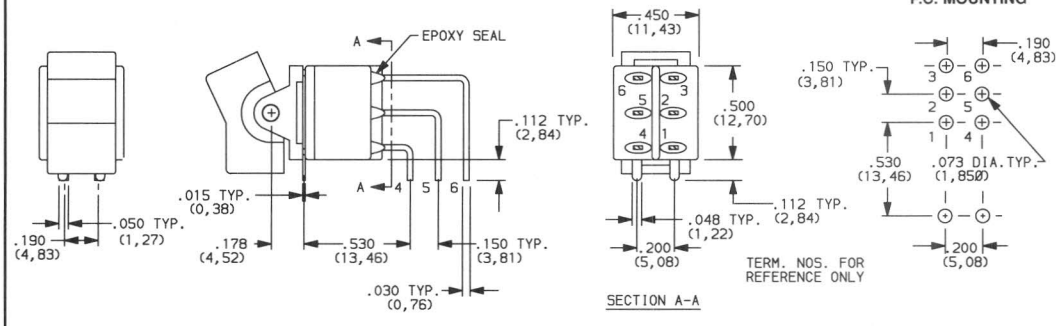


V5

DPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

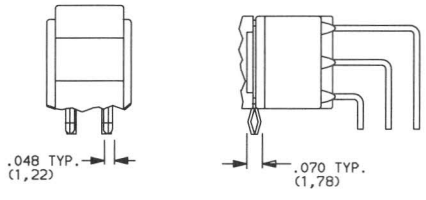
V5



Part No. Shown: E201J1V5BE2

V51 SNAP-IN

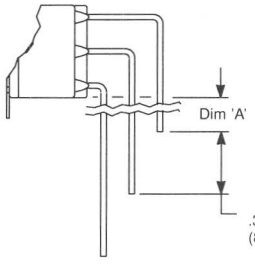
NEW



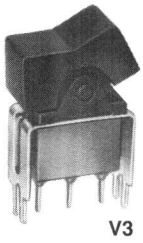
SNAP-IN DESIGN RETAINS SWITCH.

V54-V55 EXTENDED

NEW



Option	Dim 'A'
V54	.18 (4,6)
V55	.42 (10,7)

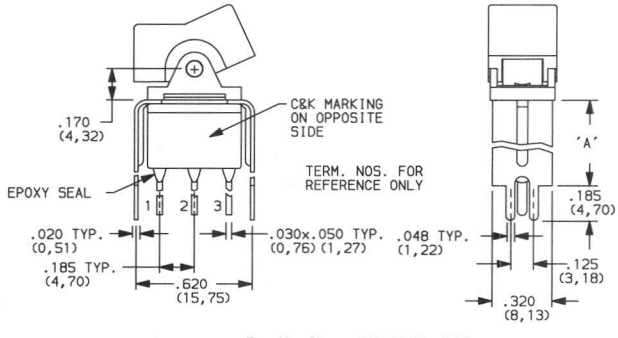


V3

SPDT

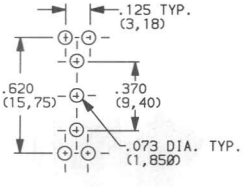
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

V3-V4-V9



Part No. Shown: E101J1V__BE2

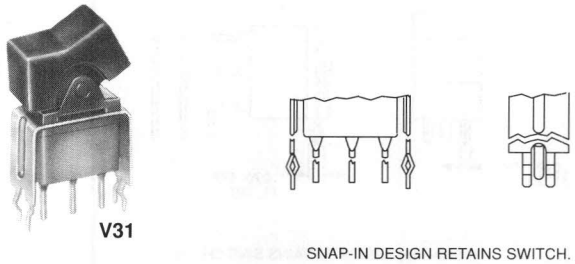
P.C. MOUNTING



Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V31-V41-V91 SNAP-IN

NEW

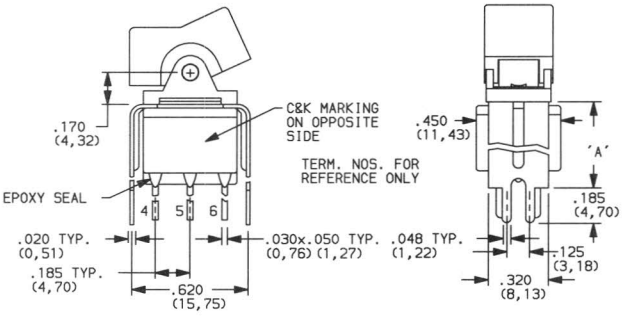


V31

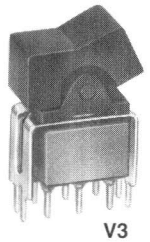
SNAP-IN DESIGN RETAINS SWITCH.

TERMINATIONS

V3-V4-V9



Part No. Shown: E201J1V__BE2

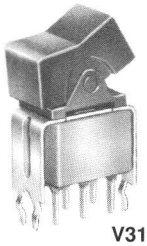


DPDT V3

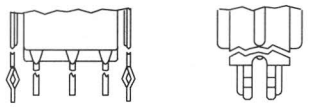
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

V31-V41-V91 SNAP-IN

NEW

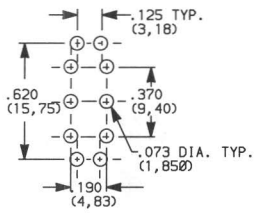


V31



SNAP-IN DESIGN RETAINS SWITCH.

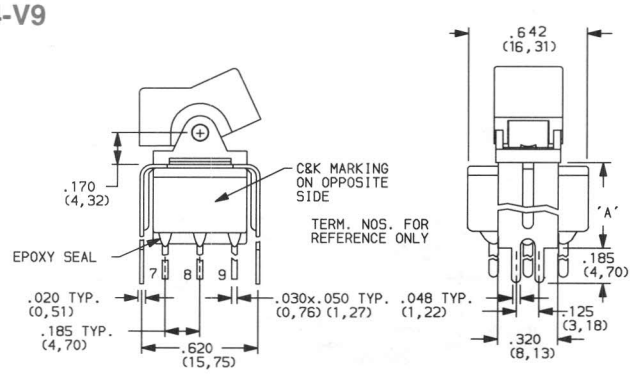
P.C. MOUNTING



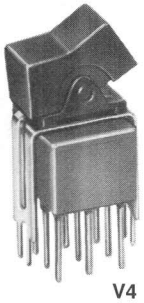
Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

NEW

V4-V9



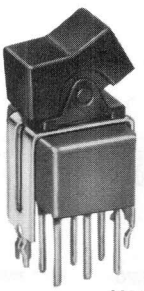
Part No. Shown: E301J1V__BE2



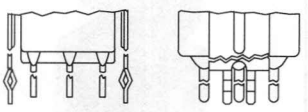
3PDT V4

Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

V41-V91 SNAP-IN

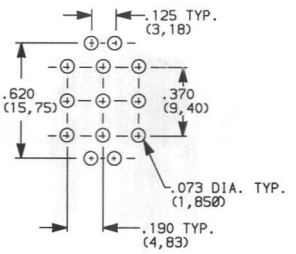


V41



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



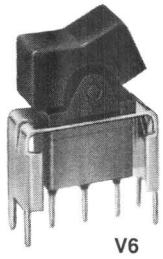
Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

C

TERMINATIONS

C

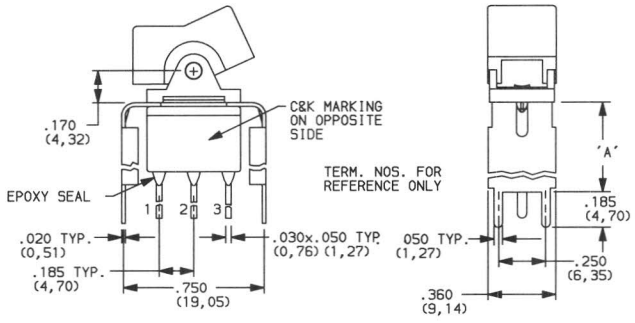
SPDT



V6

Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

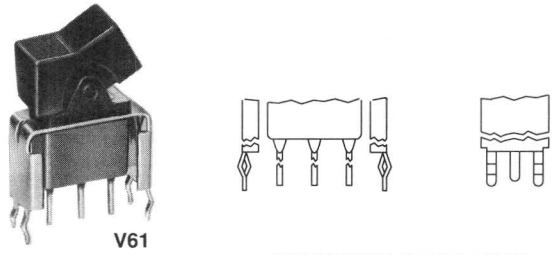
V2-V6-V7-V8



Part No. Shown: E101J1V__BE2

V21-V61-V71-V81 SNAP-IN

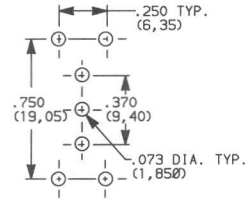
NEW



V61

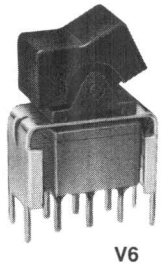
SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

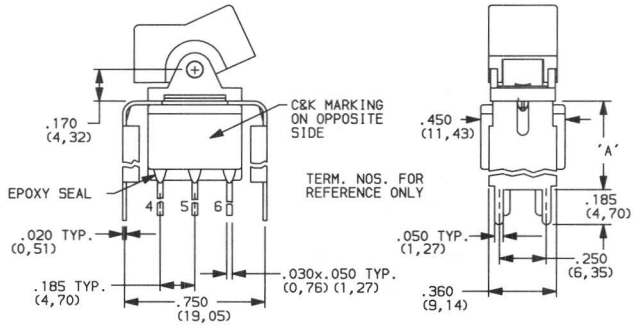
DPDT



V6

Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

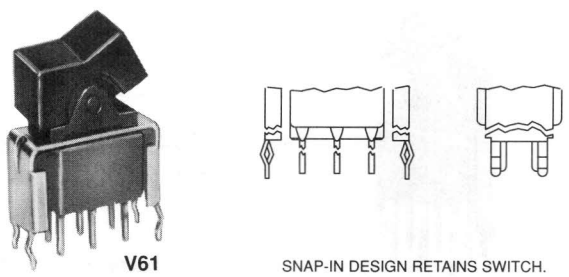
V2-V6-V7-V8



Part No. Shown: E201J1V__BE2

V21-V61-V71-V81 SNAP-IN

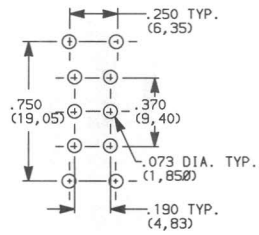
NEW



V61

SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

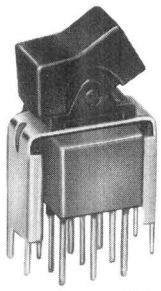
Sealed* Anti-Static Rocker and Lever Handle Switches

* Process sealed – withstands soldering and cleaning processes.

TERMINATIONS

NEW

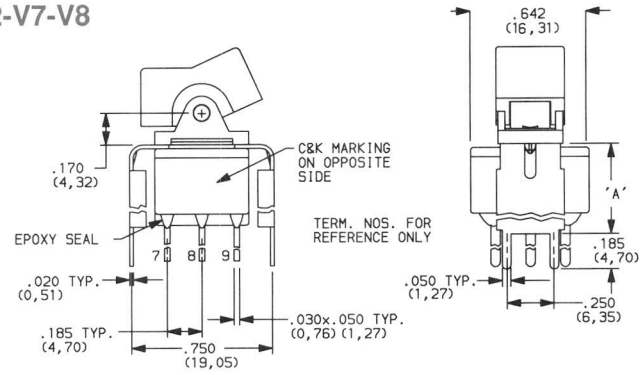
3PDT



V7

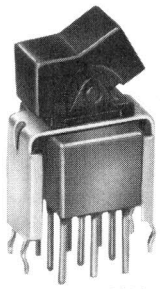
Actuator shown in pos.1.
B contact material std.
Available actuators, see pages C-16 and C-17.

V2-V7-V8

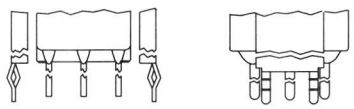


Part No. Shown: E301J1V__BE2

V21-V71-V81 SNAP-IN

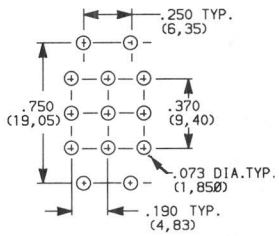


V71



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

C

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	E1XX & E2XX MODELS: 7.5 AMPS @125 V AC OR 28 V DC; 3 AMPS @ 250 V AC. E3XX MODELS: 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	E1XX AND E2XX MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 7.5 AMPS @125 V AC OR 28 V DC; 3 AMPS @ 250 V AC. E3XX MODELS: 0.4 VA MAX. @ 20 V AC OR DC MAX. OR 5 AMPS @ 125 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

All models with all options when ordered with G, L, M or Q contact material.
See pages C-14 and VIII.

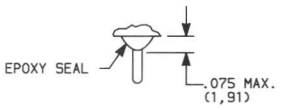
B contact material std. with all terminations.
K, L, M contact materials not available with Z terminations.

Sealed* Anti-Static Rocker and Lever Handle Switches

* Process sealed – withstands soldering and cleaning processes.

SEAL

E (STD.)



HOW TO ORDER

All available E SERIES SEALED ANTI-STATIC ROCKER AND LEVER HANDLE SWITCH options are listed on page C-12, and are described on pages C-13 thru C-26. Switches with standard options are shown on page C-13. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. models available, see page C-14.

Hardware: two each: – mounting screws, nuts, lockwashers and standoffs for 1/8 in. thk. panel are supplied std. on switches with panel mounting bracket. Hardware for other panel thicknesses also available. Actuators, frames and mounting hardware are available separately, see catalog section H.

C

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max. (B contact mat'l).

ELECTRICAL LIFE: E1XX and E2XX models: 40,000 make–and–break cycles at full load. E3XX models: 30,000 cycles.

CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

STATIC RESISTANCE: 11,000 V RMS min. @ sea level, actuator to terminals.

DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

ACTUATOR: Nylon, black std. Internal o-ring seal standard with all actuators.

FRAME: Spring steel, black std.

SWITCH SUPPORT: Brass or steel, tin plated.

ACTUATOR PIVOT & MOUNTING BRACKET: Nylon.

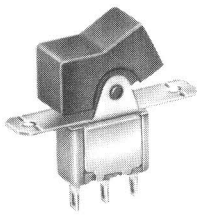
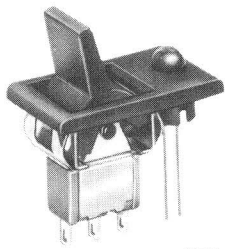
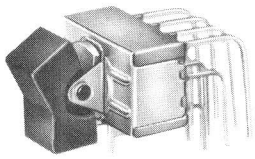
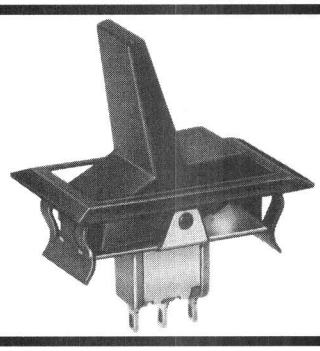
ACTUATOR PIVOT RETAINER: Stainless steel.

CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact mat'l).

TERMINAL SEAL: Epoxy.

HARDWARE: Nut, Screw, & Lockwasher – Stainless steel. Standoff – Nylon std. Aluminum available, consult factory.

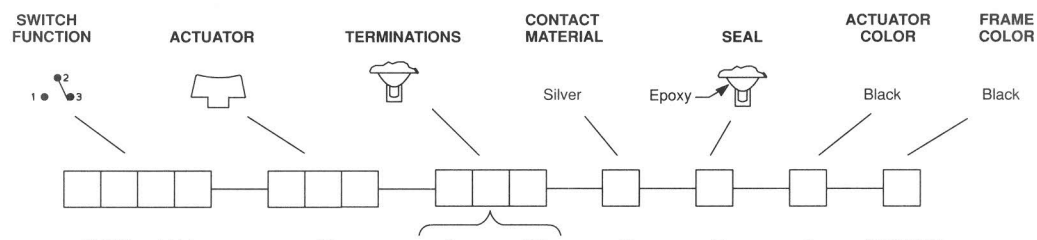
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

models available, see page C-29.

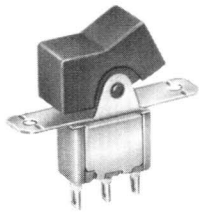
Easy Build-A-Switch:

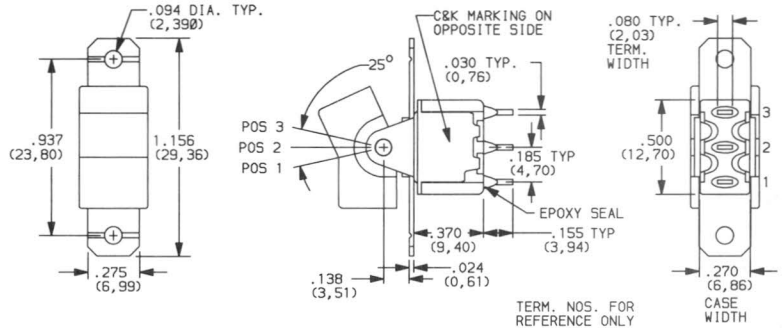
Below is a complete listing of available options for 7000 SERIES ROCKER AND LEVER HANDLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page C-28; all available options are shown and described on pages C-29 thru C-48. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-48. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.



7101	U11	J1	A	W	B	E	1	(NONE)
7103	U13	J2	A3	W1	G	I	2	1
7105	U15	J3	AV2	W3	K		3	2
7107	U17	J4	AV3	W4	L		4	3
7108	U18	J5	AV5	W5	M		5	4
7109	U19	J10	AW	Z	Q		6	5
7201	U21	J11	AW1	Z3			7	6
7203	U23	J15	AW3				8	7
7205	U25	J16	AW4				9	8
7207	U27	J19	AW5					9
7208	U28	J21	C					C
7209	U29	J25	V2					S
7211	U211	J26	V3					
7213	U213	J37	V4					
7215	U215	J47	V5					
7301	U31	J50	V6					
7303	U33	J51	V7					
7305	U35	J52	V8					
7307	U37	J53	V9					
7308	U38	J54	V21					
7309	U39	J57	V31					
7401	U41	J60	V41					
7403	U43	J61	V51					
7405	U45	J62	V54					
7407	U47	J63	V55					
7408	U48	J64	V61					
7409	U49	J90	V71					
7411	U411	J91	V81					
7413	U413	J92	V91					
7415	U415	J93						
		J94						

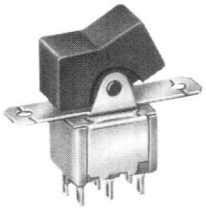
SWITCHES WITH STANDARD OPTIONS

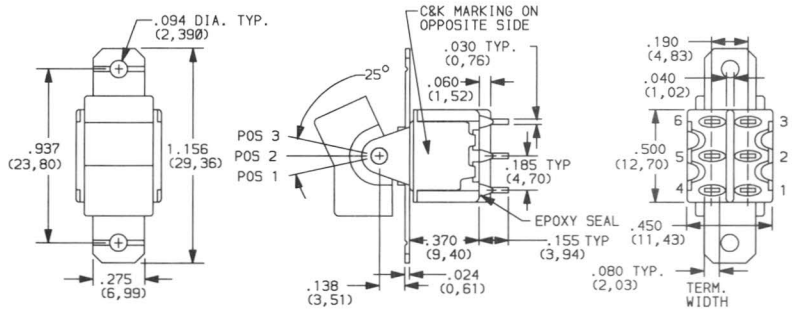




SPDT

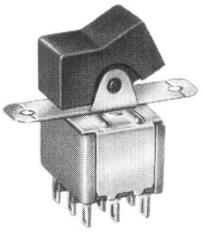
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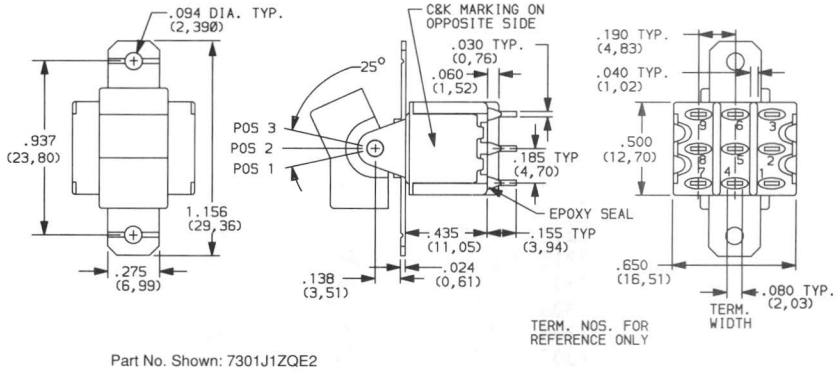




DPDT

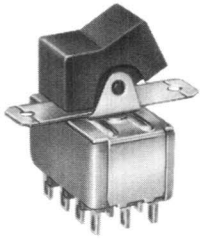
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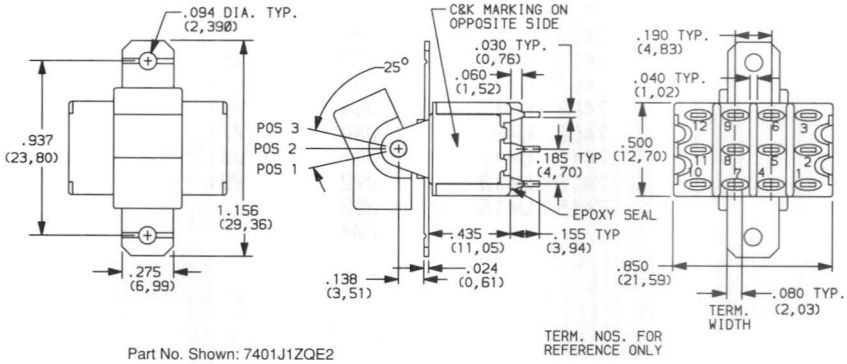




3PDT

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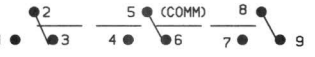




4PDT

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SWITCH FUNCTION

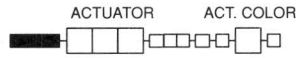
NO. POLES	MODEL NO.	UL/CSA** MODEL NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	7101	U11	ON	NONE	ON	2-3	OPEN	2-1	
	7103	U13	ON	OFF	ON				
	7105	U15	MOM.	OFF	MOM.				
	7107	U17	ON	OFF	MOM.				
	7108	U18	ON	NONE	MOM.				
	7109	U19	NONE	ON	MOM.	N/A	2-3	2-1	SPDT
DP	7201	U21	ON	NONE	ON	2-3,5-6	OPEN	2-1,5-4	
	7203	U23	ON	OFF	ON				
	7205	U25	MOM.	OFF	MOM.				
	7207	U27	ON	OFF	MOM.				
	7208	U28	ON	NONE	MOM.				
	7209	U29	NONE	ON	MOM.	N/A	2-3,5-6	2-1,5-4	
	7211*	U211*	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	
	7213*	U213*	ON	ON	MOM.				
	7215*	U215*	MOM.	ON	MOM.				DPDT
3P	7301	U31	ON	NONE	ON	2-3,5-6,8-9	OPEN	2-1,5-4,8-7	
	7303	U33	ON	OFF	ON				
	7305	U35	MOM.	OFF	MOM.				
	7307	U37	ON	OFF	MOM.				
	7308	U38	ON	NONE	MOM.				
	7309	U39	NONE	ON	MOM.	N/A	2-3,5-6,8-9	2-1,5-4,8-7	3PDT
4P	7401	U41	ON	NONE	ON	2-3,5-6,8-9,11-12	OPEN	2-1,5-4,8-7,11-10	
	7403	U43	ON	OFF	ON				
	7405	U45	MOM.	OFF	MOM.				
	7407	U47	ON	OFF	MOM.				
	7408	U48	ON	NONE	MOM.				
	7409	U49	NONE	ON	MOM.	N/A	2-3,5-6,8-9,11-12	2-1,5-4,8-7,11-10	
	7411*	U411*	ON	ON	ON	2-3,5-6,8-9,11-12	2-3,5-4,8-9,11-10	2-1,5-4,8-7,11-10	
	7413*	U413*	ON	ON	MOM.				
	7415*	U415*	MOM.	ON	MOM.				4PDT

MOM. = MOMENTARY

** U11-U415 model nos. with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.
Z termination option CSA certified only when ordered with I epoxy base seal.

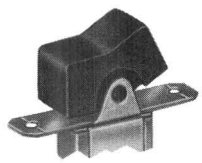
* Wiring for 3-way switch, see page X.

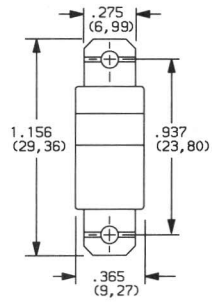
ACTUATORS – PANEL MOUNT

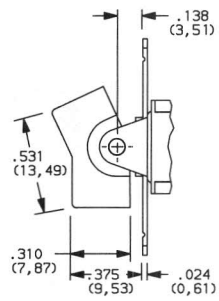


C

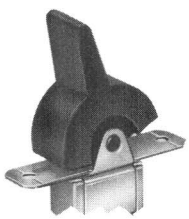
J1 (STD.)

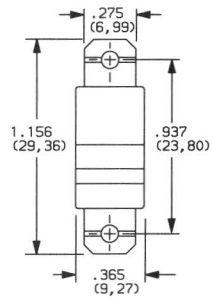


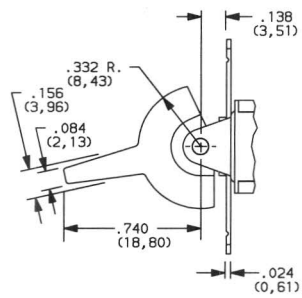




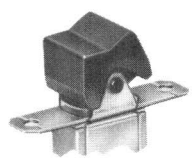
J2

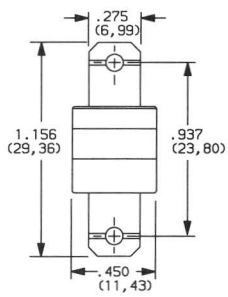


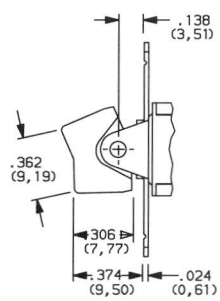




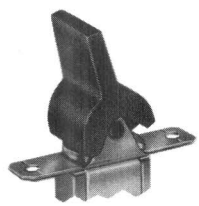
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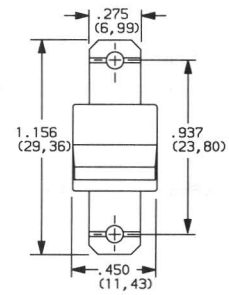


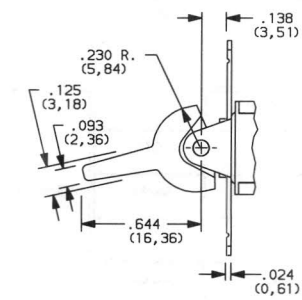




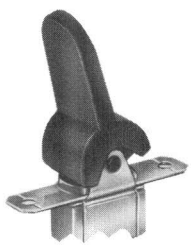
J64

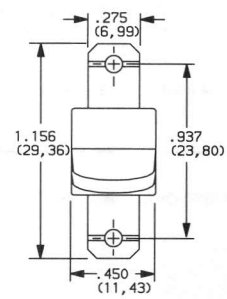


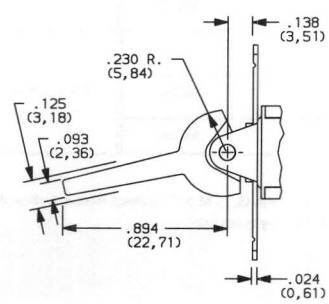




J94







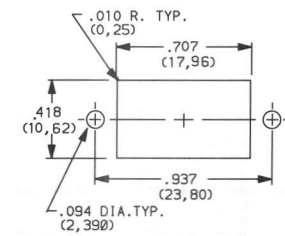
ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

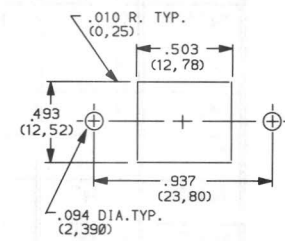
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-48. Hardware is available separately, see catalog section H.

Available with Z, C, Z3, or W-W5 terminations.

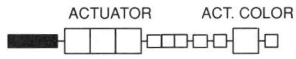
PANEL MOUNTING J1 – J2



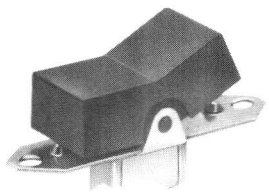
PANEL MOUNTING J54 – J64 – J94

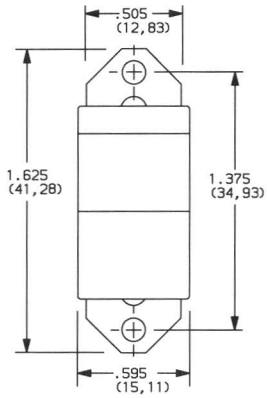


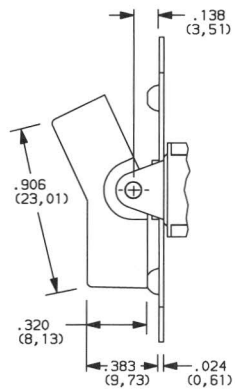
ACTUATORS – PANEL MOUNT



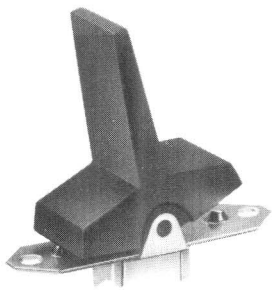
J3

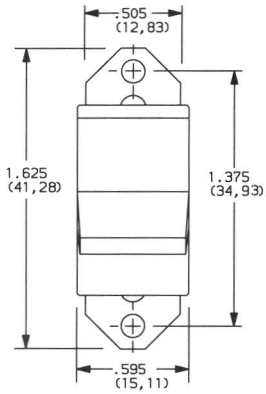


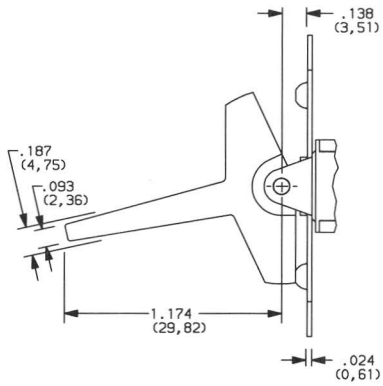




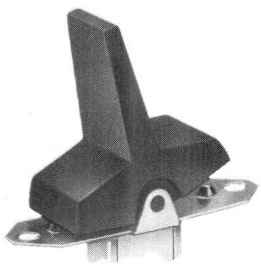
J4

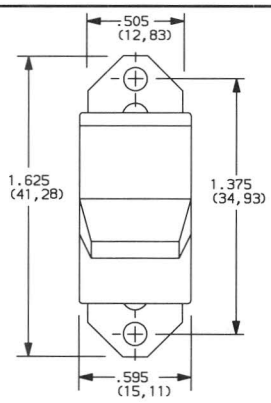


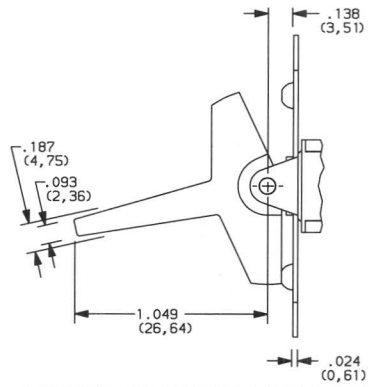




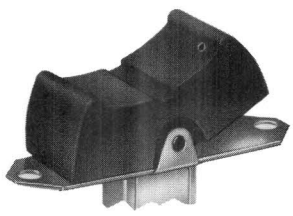
J5

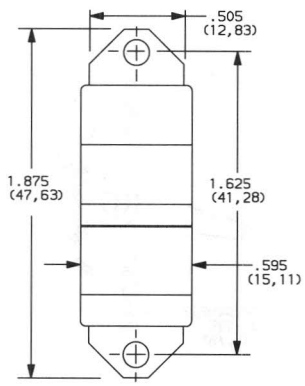


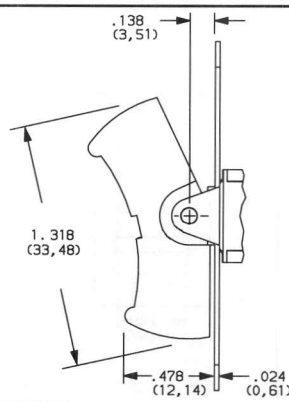




J10







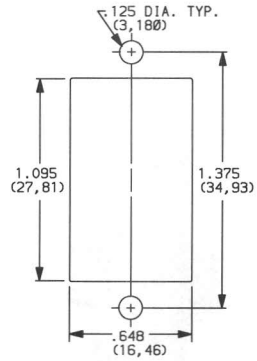
ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

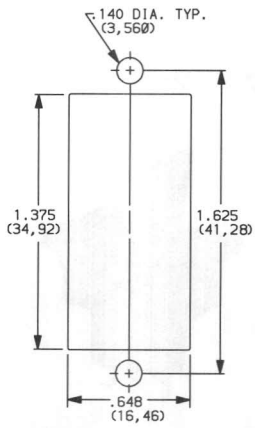
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-48. Hardware is available separately, see catalog section H.

Available with Z, C, Z3, or W-W5 terminations.

PANEL MOUNTING J3 – J4 – J5



PANEL MOUNTING J10



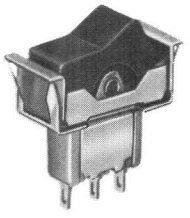
C

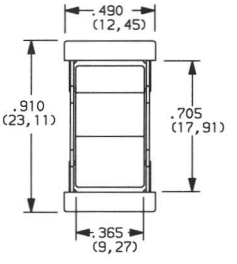
ACTUATORS – SNAP-IN FRONT MOUNT

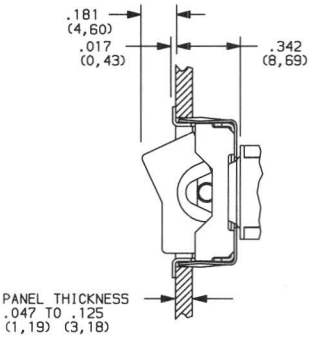
ACTUATOR ACT. COLOR

FRAME COLOR

J15

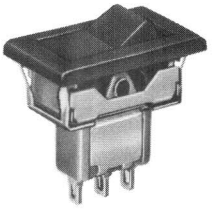


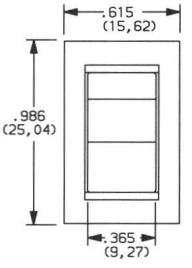


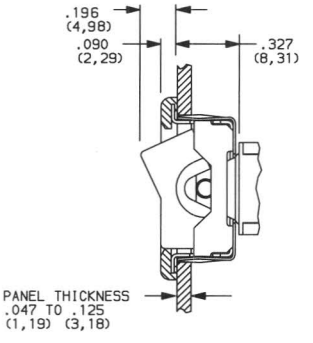


No frame color choice required.

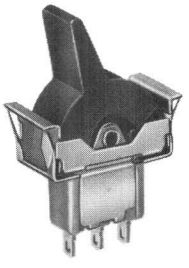
J16

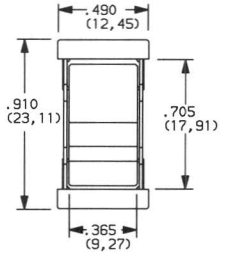


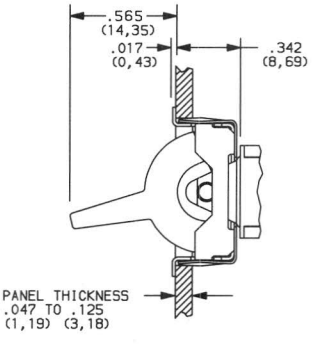




J25

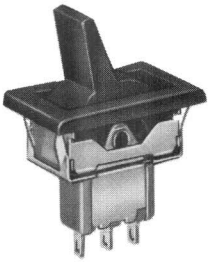


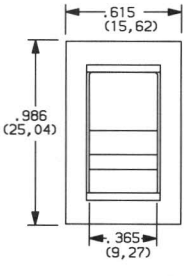


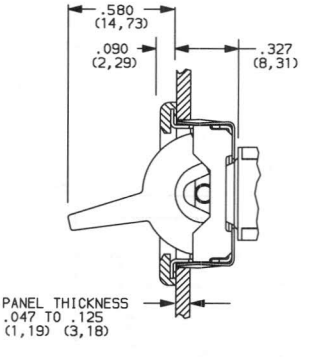


No frame color choice required.

J26







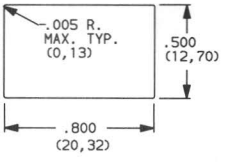
ACTUATOR AND FRAME COLORS

OPTION CODE	ACTUATOR AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

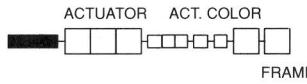
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

Available with 71XX, 72XX, U1XX, U2XX models and Z, C, Z3, or W-W5 terminations.

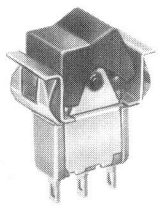
PANEL MOUNTING

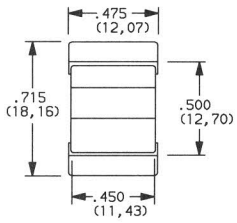


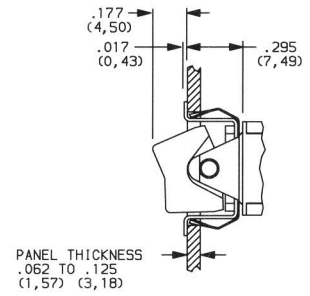
ACTUATORS – SNAP-IN FRONT MOUNT



J50

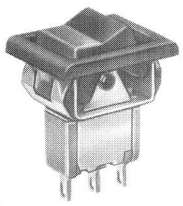


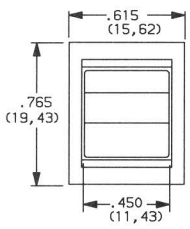


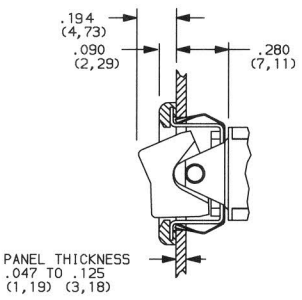


No frame color choice required.

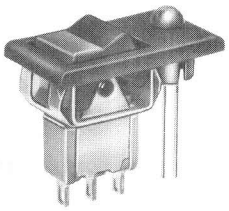
J51

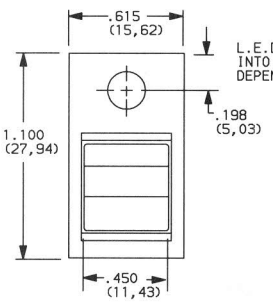


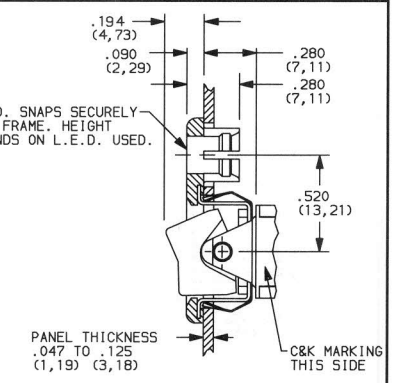




J52

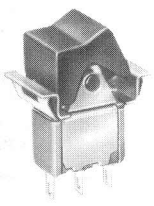


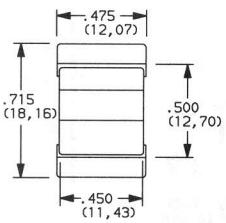


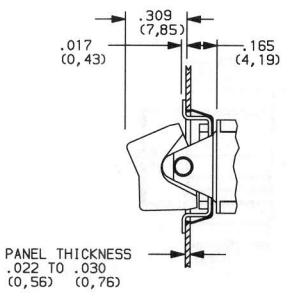


U.S. Patent No. 4,004, 120.
LED not included.
See page IX for LED information.

J53







No frame color choice required.

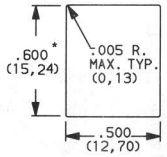
ACTUATOR AND FRAME COLORS

OPTION CODE	ACTUATOR AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

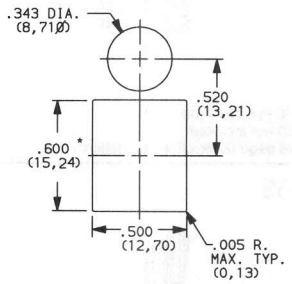
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

Available with 71XX, 72XX, U1XX, U2XX models and Z, C, Z3, or W-W5 terminations.

PANEL MOUNTING – J50, J51, J53



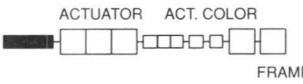
PANEL MOUNTING – J52



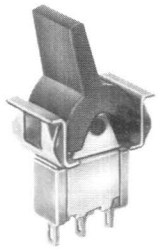
* For J50: Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.
For J51, J52: Increase this dim. to .620/.625 (15,75/15,88) for .060/.125 (1,52/3,18) thk. panels.

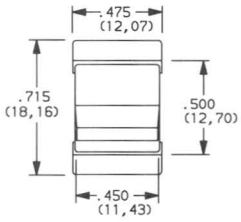
C

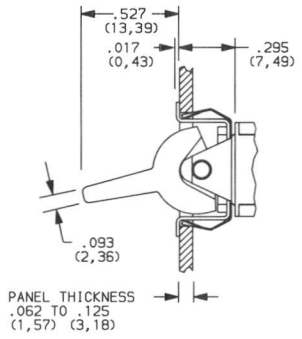
ACTUATORS – SNAP-IN FRONT MOUNT



J60

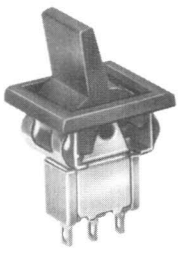


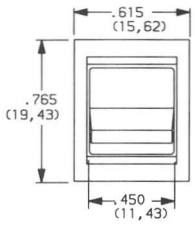


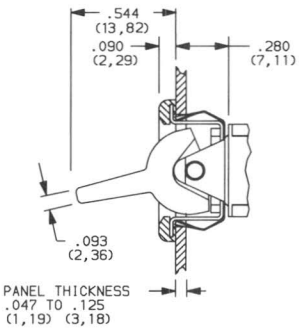


No frame color choice required.

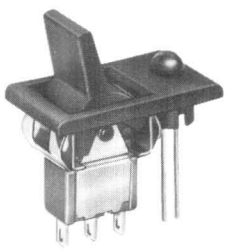
J61

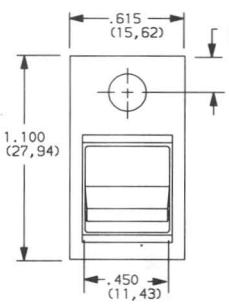


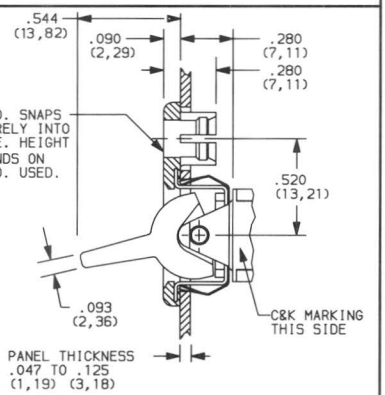




J62

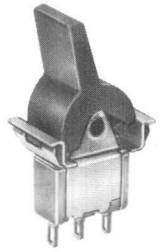


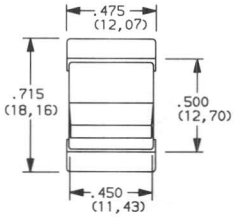


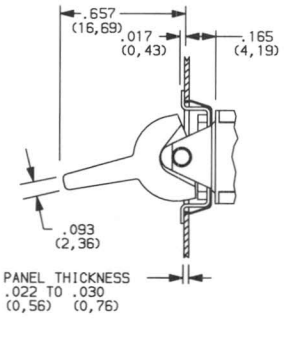


U.S. Pat. No. 4,004, 120.
LED not included.
See page IX for LED information.

J63







No frame color choice required.

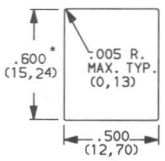
ACTUATOR AND FRAME COLORS

OPTION CODE	ACTUATOR AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

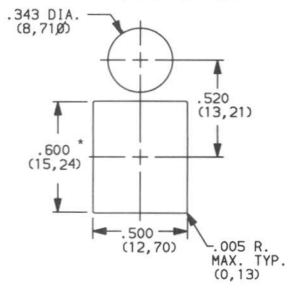
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

Available with 71XX, 72XX, U1XX, U2XX models and Z, C, Z3, or W-W5 terminations.

PANEL MOUNTING – J60, J61, J63



PANEL MOUNTING – J62



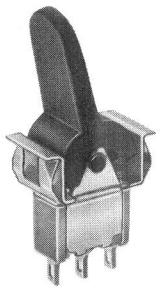
* For J60: Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.
For J61, J62: Increase this dim. to .620/.625 (15,75/15,88) for .060/.125 (1,52/3,18) thk. panels.

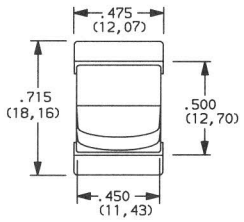
ACTUATORS – SNAP-IN FRONT MOUNT

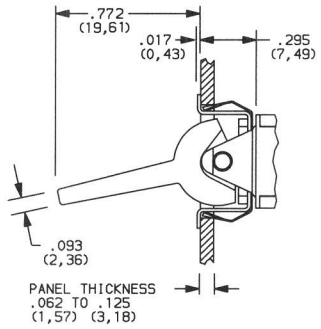
ACTUATOR ACT. COLOR

FRAME COLOR

J90

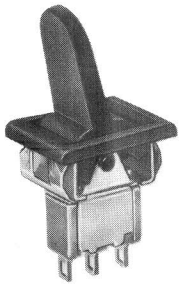


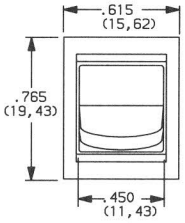


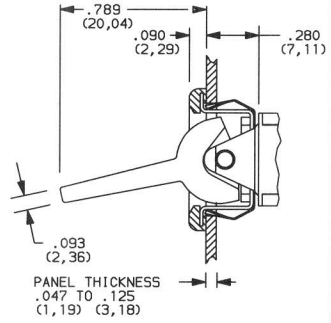


No frame color choice required.

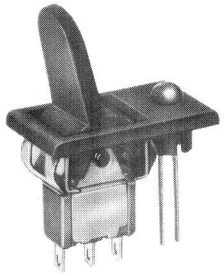
J91

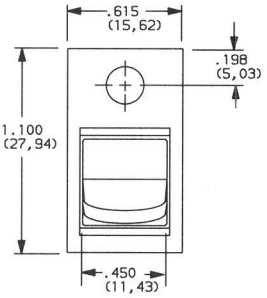


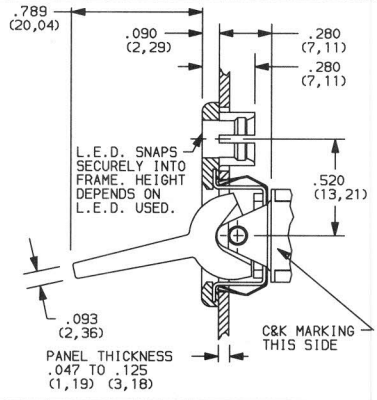




J92

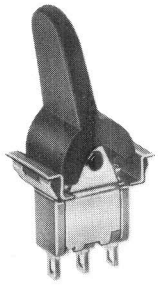


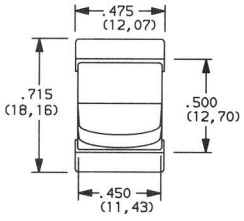


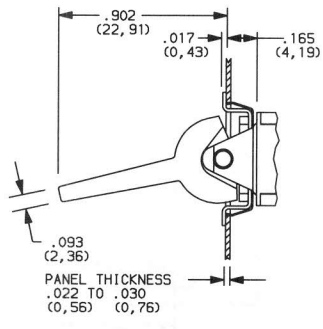


U.S. Pat. No 4, 004, 120.
LED not included.
See page IX for LED information.

J93







No frame color choice required.

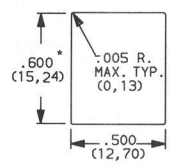
ACTUATOR AND FRAME COLORS

OPTION CODE	ACTUATOR AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

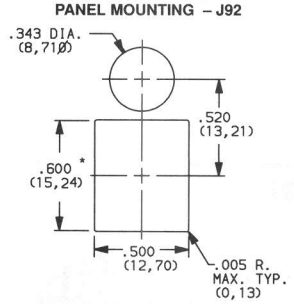
Select actuator color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Actuator and frame finish: matte. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

Available with 71XX, 72XX, U1XX, U2XX models and Z, C, Z3, or W-W5 terminations.

PANEL MOUNTING – J90, J91, J93



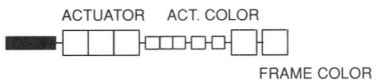
PANEL MOUNTING – J92



* For J90: Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.
For J91, J92: Increase this dim. to .620/.625 (15,75/15,88) for .060/.125 (1,52/3,18) thk. panels.

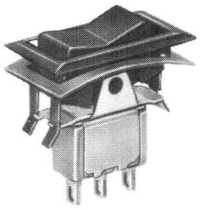
C

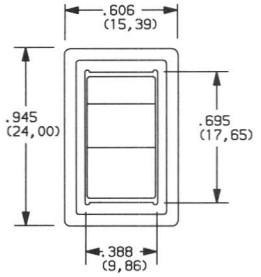
ACTUATORS – REAR MOUNT

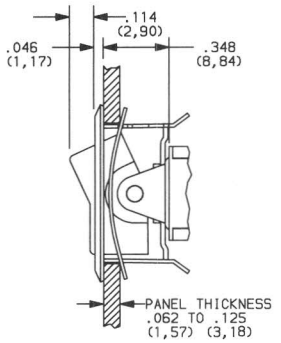


C

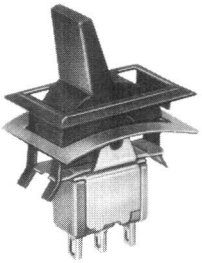
J11

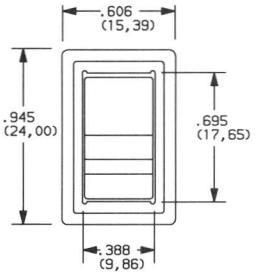


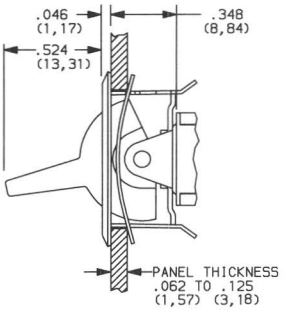




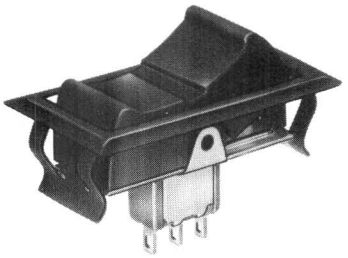
J21

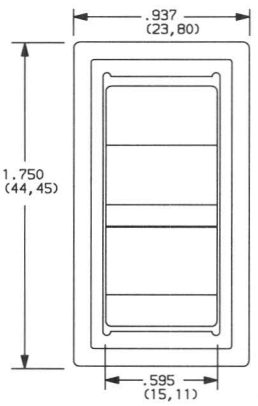


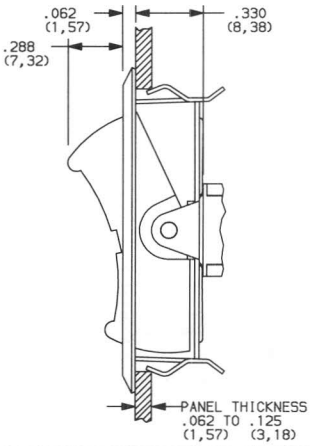




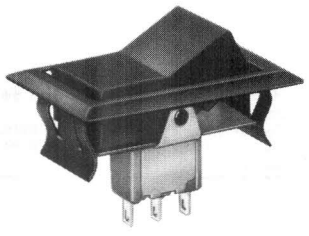
J19

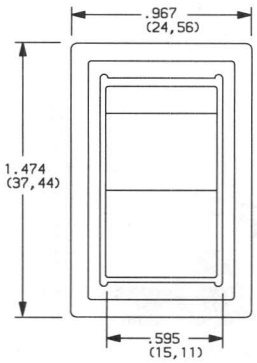


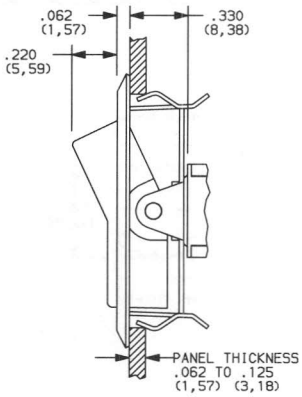




J37







ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

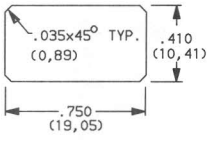
FRAME COLOR

OPTION CODE	FRAME COLOR
1	WHITE
2	BLACK (std.)
C	BRIGHT CHROME
S	SATIN CHROME

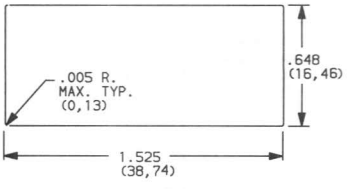
Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte. Frame finish: gloss. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

Available with Z, C, Z3, or W-W5 terminations.

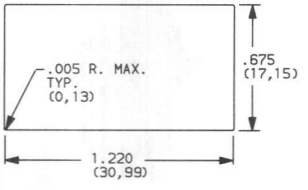
PANEL MOUNTING – J11, J21



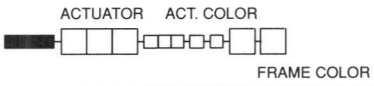
PANEL MOUNTING – J19



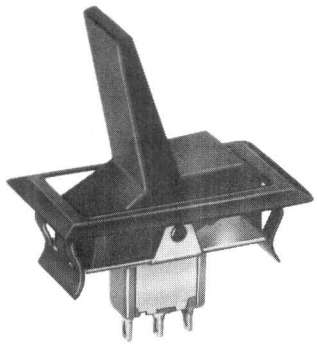
PANEL MOUNTING – J37

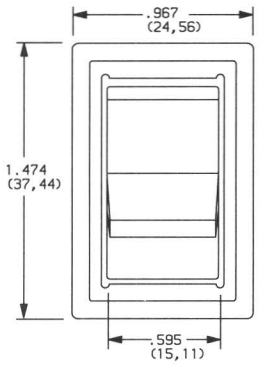


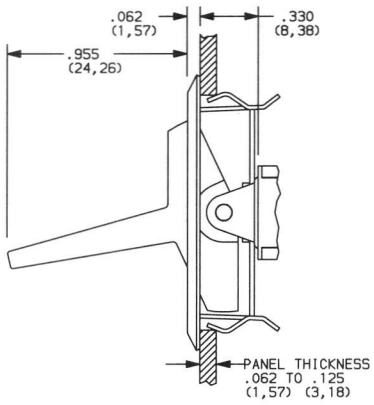
ACTUATORS – REAR MOUNT



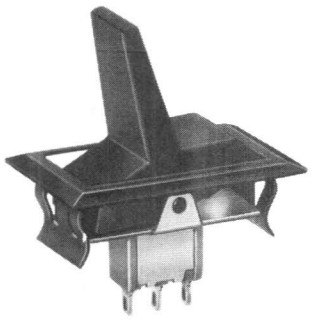
J47

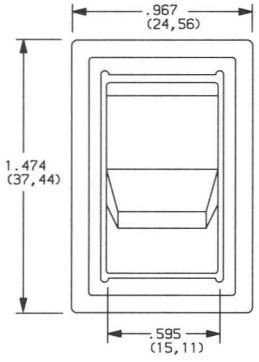


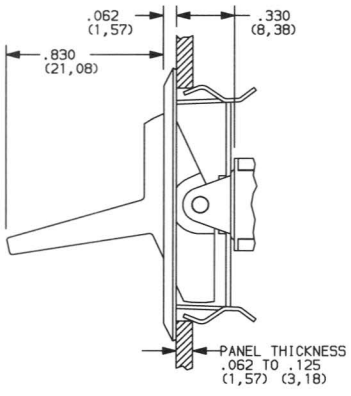




J57







ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

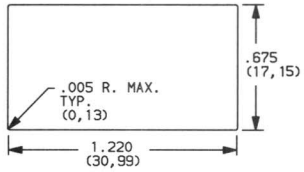
FRAME COLOR

OPTION CODE	FRAME COLOR
1	WHITE
2	BLACK (std.)
C	BRIGHT CHROME
S	SATIN CHROME

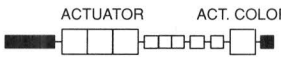
Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte, frame finish: gloss. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

J47, J57 actuators available with Z, C, Z3, or W-W5 terminations.

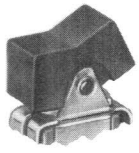
PANEL MOUNTING
J47 – J57

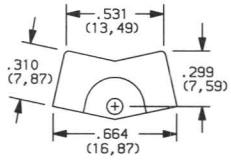


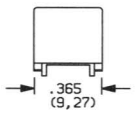
ACTUATORS – P.C. MOUNT



J1

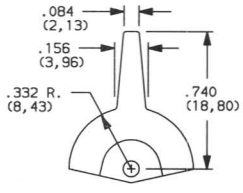


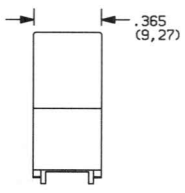




J2







ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

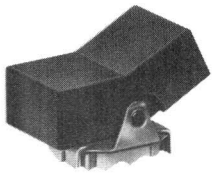
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Actuators available separately, see catalog section H.

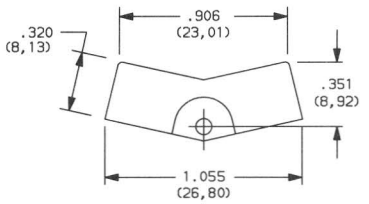
J1, J2 actuators available with A, A3, AW-AW5, AV2-AV5, V2-V91 terminations. Some permissible actuator/termination combinations may lack clearance between act. and P.C. board, and care must be exercised to accommodate this condition.

ACTUATORS – P.C. MOUNT

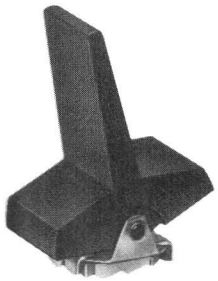
ACTUATOR ACT. COLOR

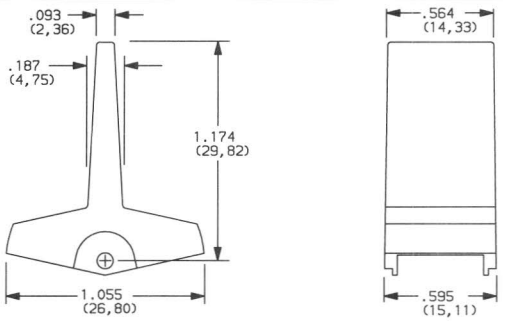
J3



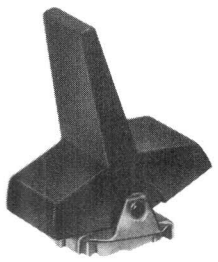


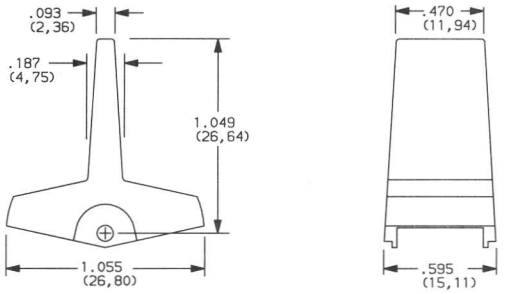
J4



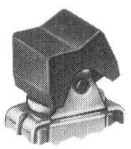


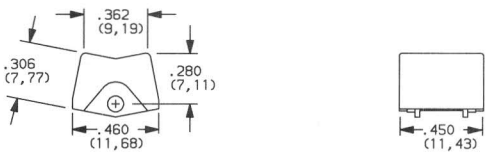
J5



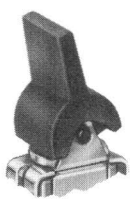


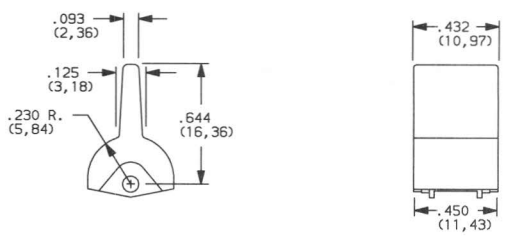
J50





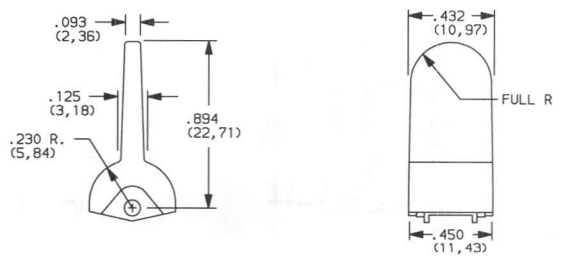
J60





J90





ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

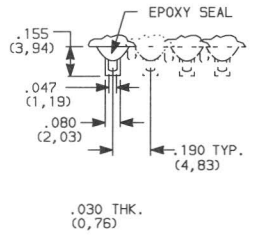
Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Actuators are available separately, see catalog section H.

J3, J4, & J5 actuators available with AV2-AV5, V2-V91 terminations. Some permissible actuator/termination combinations may lack clearance between actuator and P.C. board, and care must be exercised to accommodate this condition.

J50, J60, & J90 actuators available with A, A3, AW-AW5, AV2-AV5, & V2-V91 terminations.

TERMINATIONS

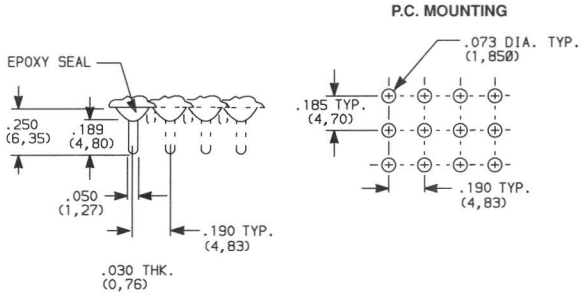
Z (STD.)



SPDT thru **4PDT**

Q contact material std.
Not avail. with K, L, or M contact material.
Available actuators, see pages C-30 thru C-37.

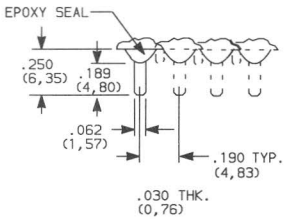
C



SPDT thru **4PDT**

Q contact material std.
Available actuators, see pages C-30 thru C-37.

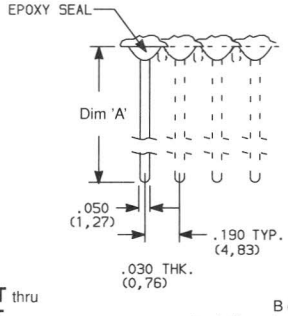
Z3 QUICK CONNECT



SPDT thru **4PDT**

Q contact material std.
Available actuators, see pages C-30 thru C-37.
Mating quick connector available; order part no. 530100000.

W-W1-W3-W4-W5 WIRE WRAP

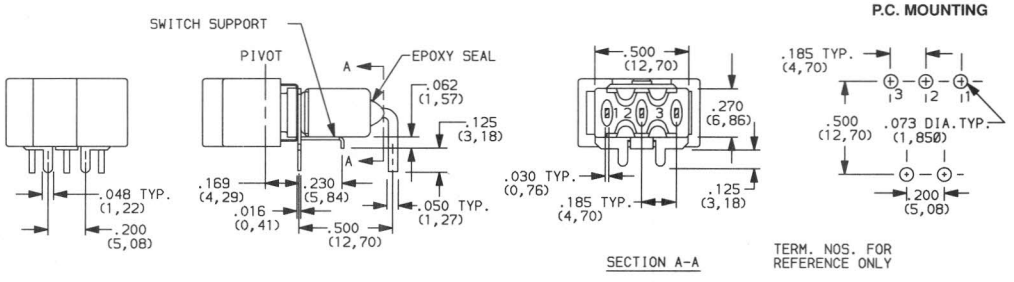


Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

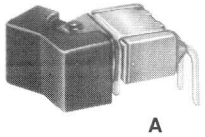
SPDT thru **4PDT**

B contact material std.
Available actuators, see pages C-30 thru C-37.

A



Part No. Shown: 7101J1ABE2



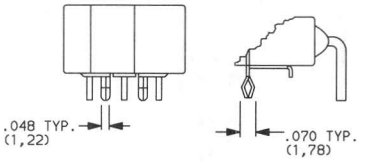
A

SPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Note: P.C. pattern must clear switch support leg.
Available actuators, see pages C-37 and C-38.

A3 SNAP-IN

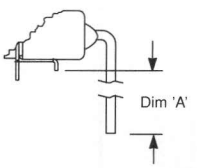
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4-AW5 EXTENDED

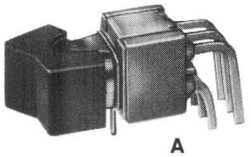
NEW



Option	Dim 'A'
AW	.44 (11,2)
AW1	.66 (16,8)
AW3	.14 (3,6)
AW4	.77 (19,6)
AW5	1.02 (25,9)

TERMINATIONS

C



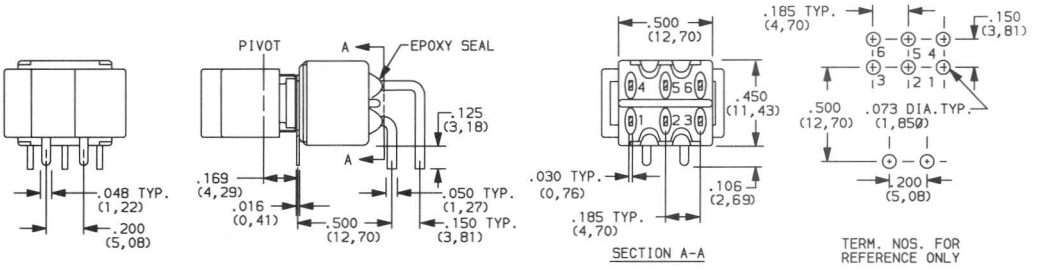
A

DPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

A

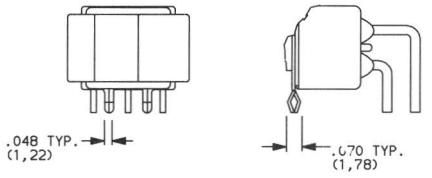
P.C. MOUNTING



Part No. Shown: 7201J1ABE2

A3 SNAP-IN

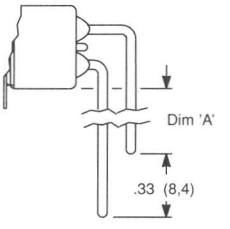
NEW



SNAP-IN DESIGN RETAINS SWITCH.

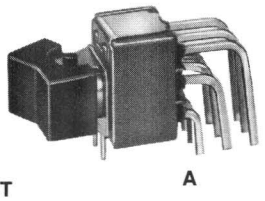
AW-AW1-AW4-AW5 EXTENDED

NEW



Option	Dim 'A'
AW	.19 (4,8)
AW1	.40 (10,2)
AW4	.50 (12,7)
AW5	.74 (18,8)

NEW



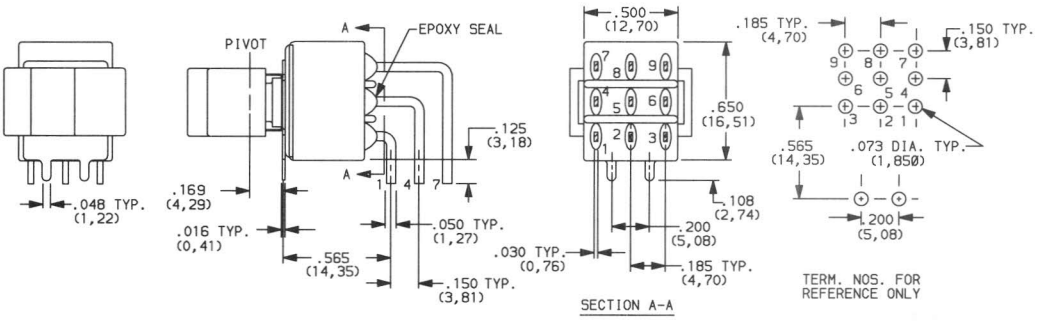
A

3PDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

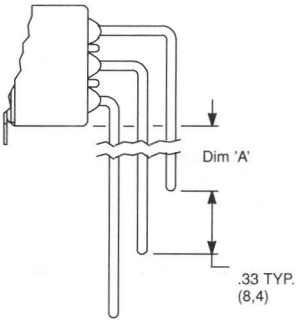
A

P.C. MOUNTING



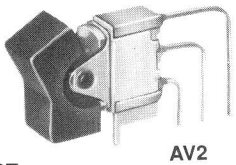
Part No. Shown: 7301J1ABE2

AW4-AW5 EXTENDED



Option	Dim 'A'
AW4	.37 (9,4)
AW5	.40 (10,16)

TERMINATIONS

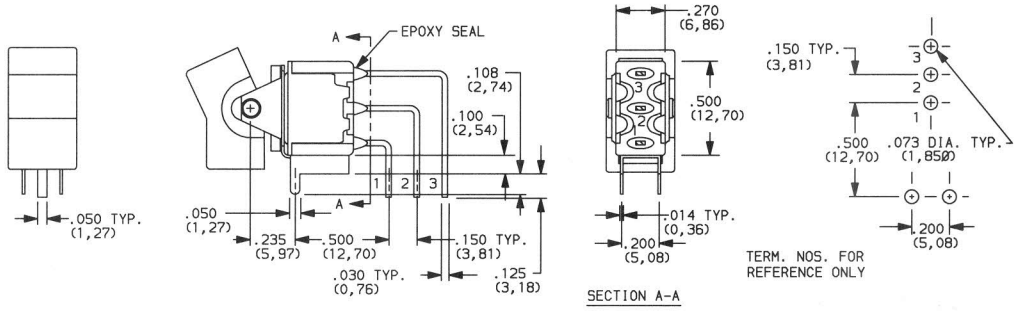


AV2

SPDT

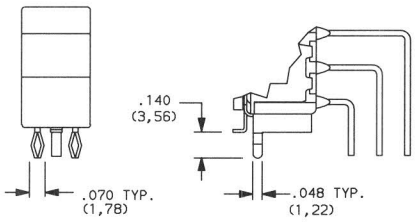
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

AV2



Part No. Shown: 7101J1AV2BE2

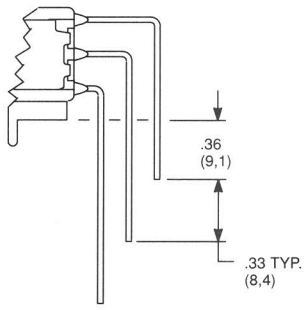
AV3 SNAP-IN

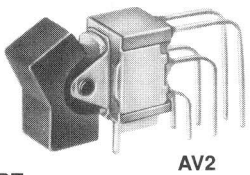


SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED

NEW



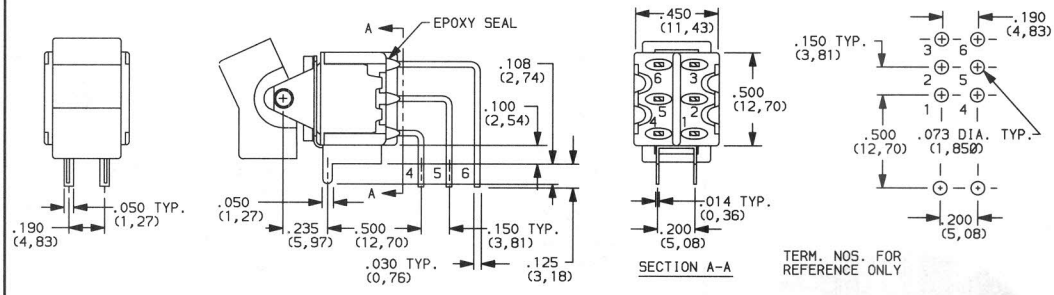


AV2

DPDT

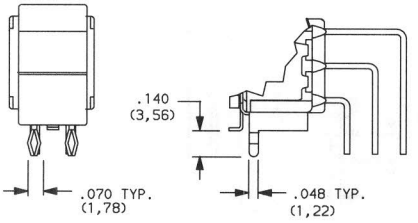
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

AV2



Part No. Shown: 7201J1AV2BE2

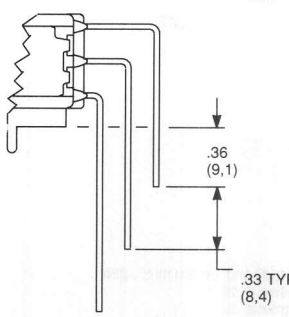
AV3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

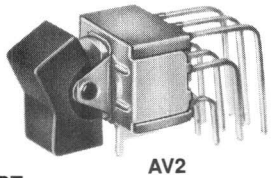
AV5 EXTENDED

NEW



TERMINATIONS

C



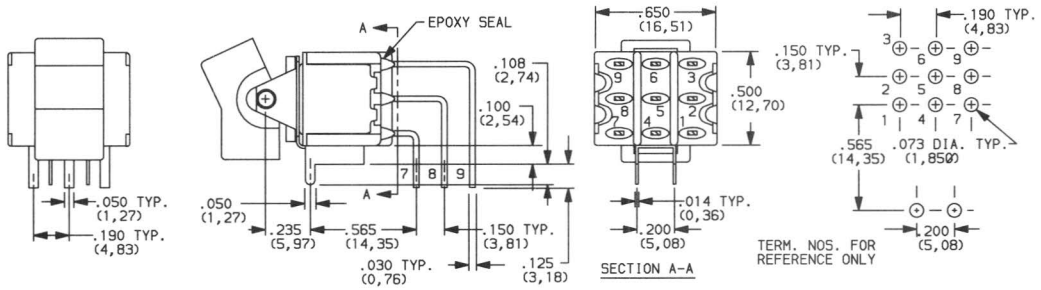
AV2

3PDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

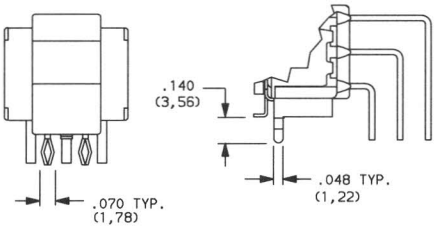
AV2

P.C. MOUNTING



Part No. Shown: 7301J1AV2BE2

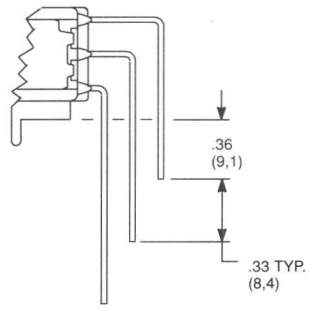
AV3 SNAP-IN

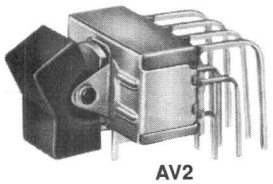


SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED

NEW





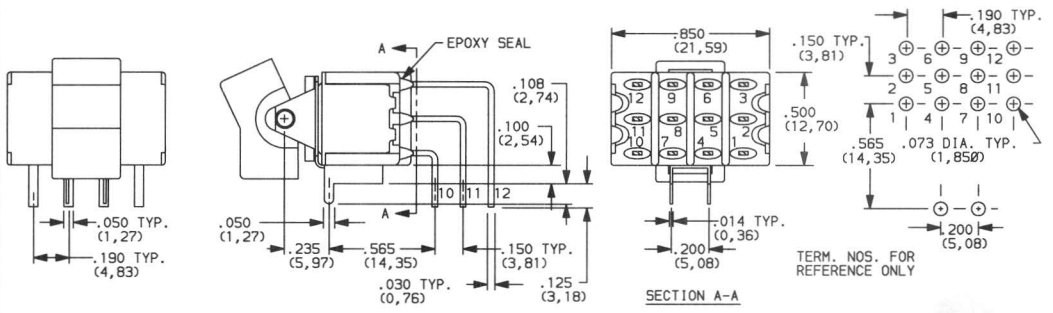
AV2

4PDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

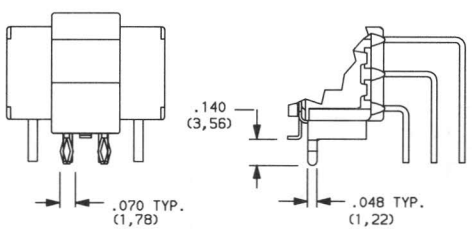
AV2

P.C. MOUNTING



Part No. Shown: 7401J1AV2BE2

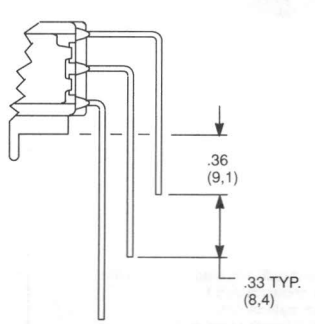
AV3 SNAP-IN



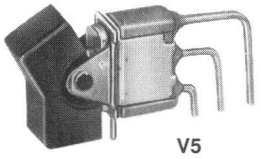
SNAP-IN DESIGN RETAINS SWITCH.

AV5 EXTENDED

NEW



TERMINATIONS



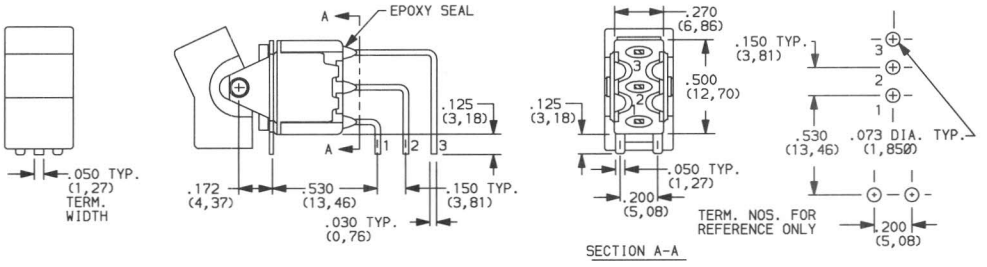
V5

SPDT

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

V5

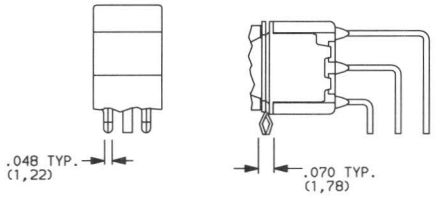
P.C. MOUNTING



Part No. Shown: 7101J1V5BE2

V51 SNAP-IN

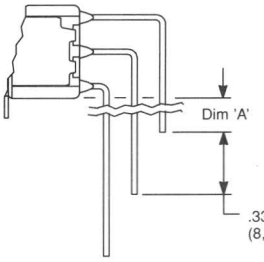
NEW



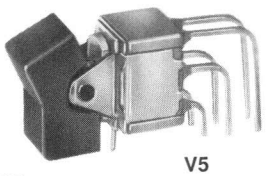
SNAP-IN DESIGN RETAINS SWITCH.

V54-V55 EXTENDED

NEW



Option	Dim 'A'
V54	.24 (6,1)
V55	.48 (12,2)



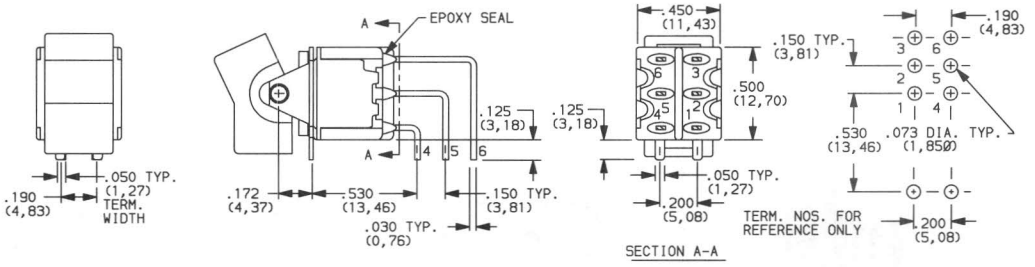
V5

DPDT

Term. bend radii and lead-in mfg. option.
Actautor shown in pos.1.
B contact material std.
Available actuators, see page C-16 and C-17.

V5

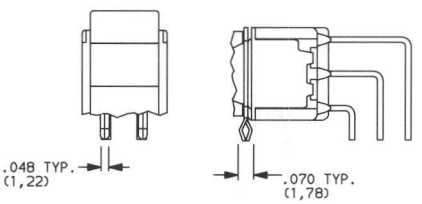
P.C. MOUNTING



Part No. Shown: 7201J1V5BE2

V51 SNAP-IN

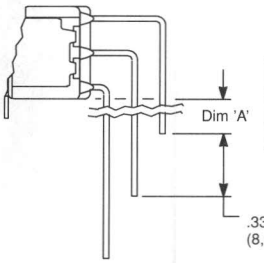
NEW



SNAP-IN DESIGN RETAINS SWITCH.

V54-V55 EXTENDED

NEW

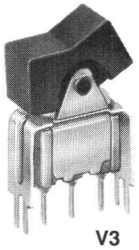


Option	Dim 'A'
V54	.24 (6,1)
V55	.48 (12,2)

TERMINATIONS

C

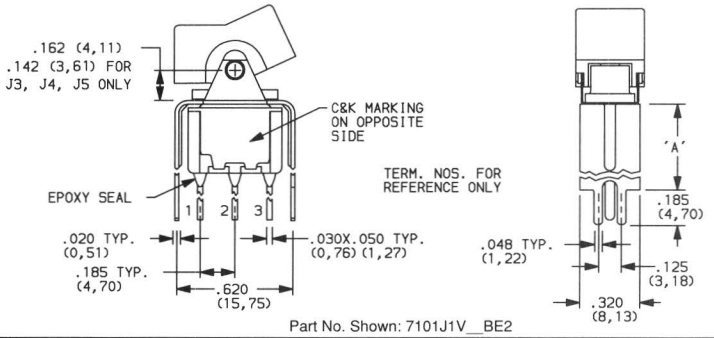
SPDT



V3

Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

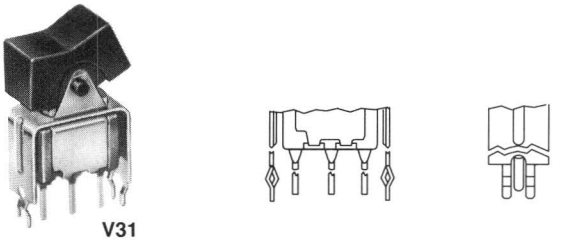
V3-V4-V9



Part No. Shown: 7101J1V__BE2

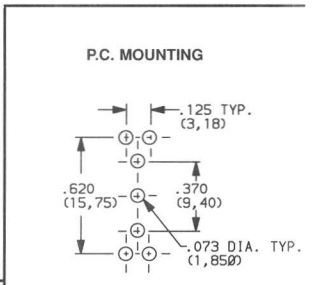
V31-V41-V91 SNAP-IN

NEW



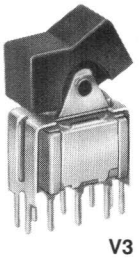
V31

SNAP-IN DESIGN RETAINS SWITCH.



Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

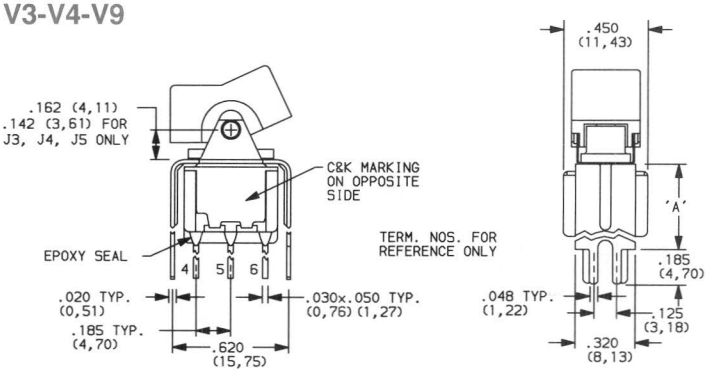
DPDT



V3

Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

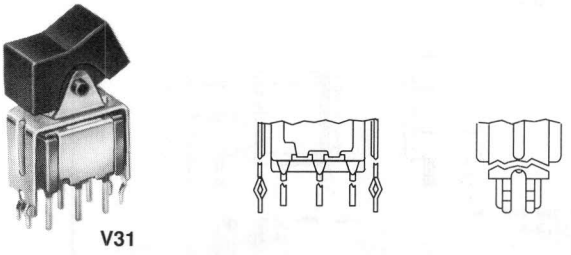
V3-V4-V9



Part No. Shown: 7201J1V__BE2

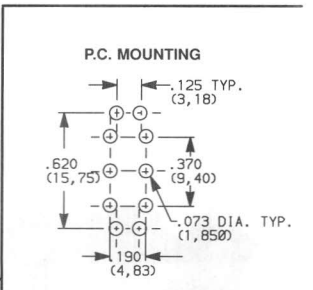
V31-V41-V91 SNAP-IN

NEW



V31

SNAP-IN DESIGN RETAINS SWITCH.

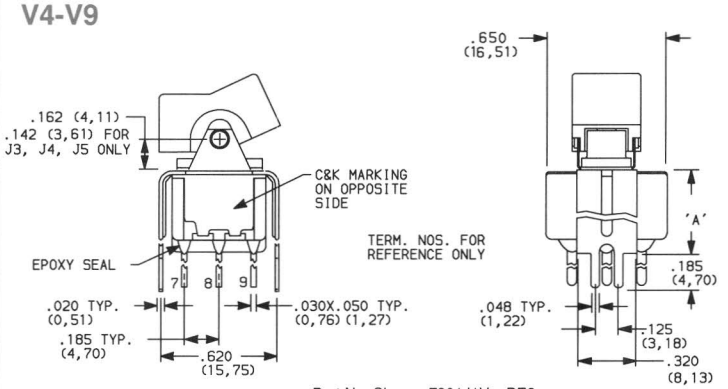


Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

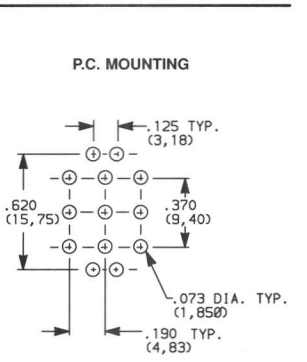
TERMINATIONS

NEW

V4-V9

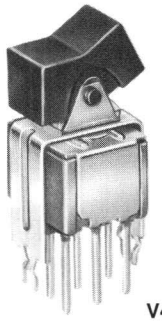


Part No. Shown: 7301J1V__BE2

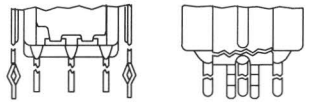


Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V41-V91 SNAP-IN

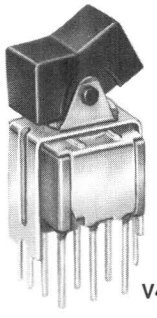


V41



SNAP-IN DESIGN RETAINS SWITCH.

3PDT

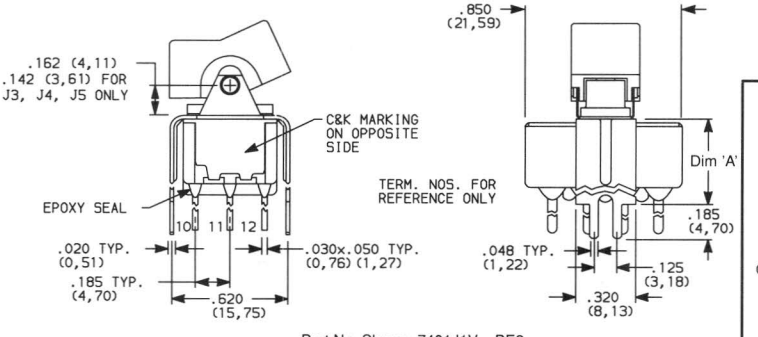


V4

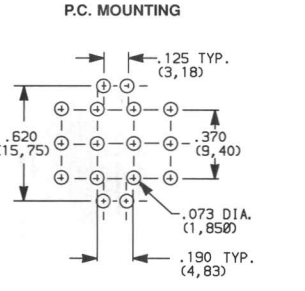
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

NEW

V4-V9

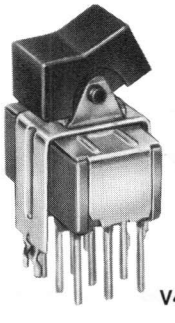


Part No. Shown: 7401J1V__BE2

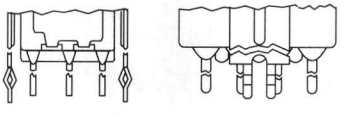


Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V41-V91 SNAP-IN

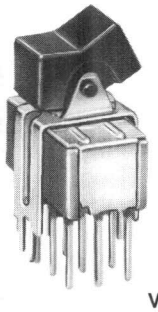


V41



SNAP-IN DESIGN RETAINS SWITCH.

4PDT



V4

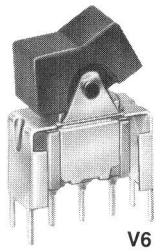
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

C

TERMINATIONS

C

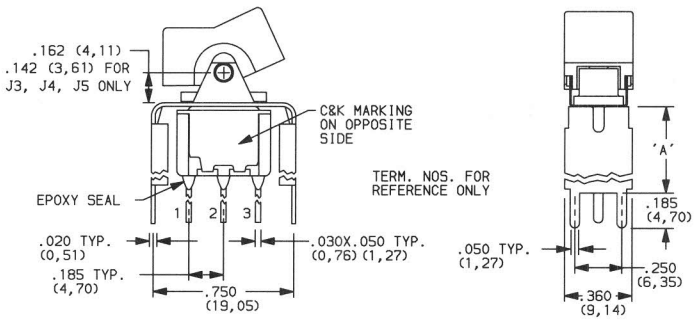
SPDT



V6

Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

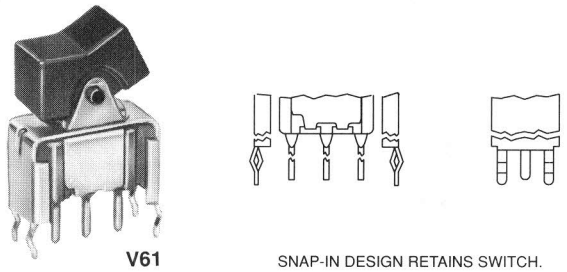
V2-V6-V7-V8



Part No. Shown: 7101J1V__BE2

V21-V61-V71-V81 SNAP-IN

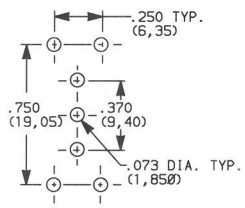
NEW



V61

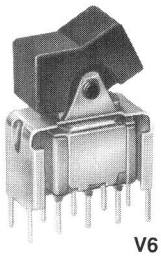
SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

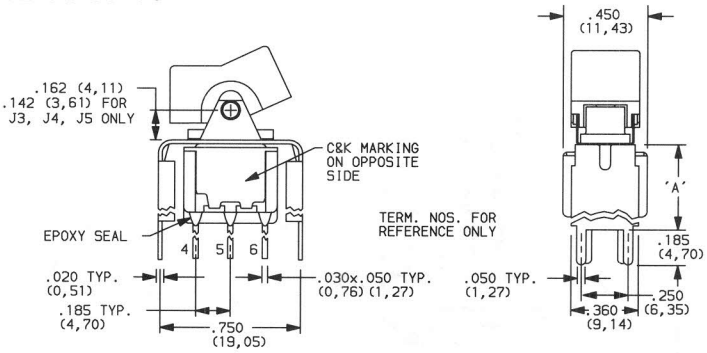
DPDT



V6

Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

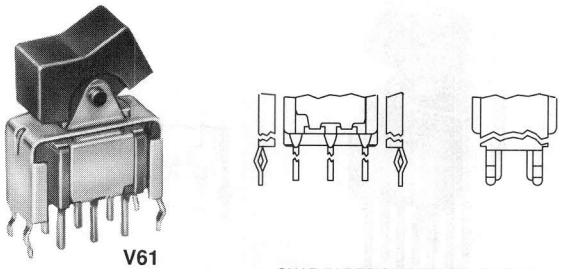
V2-V6-V7-V8



Part No. Shown: 7201J1V__BE2

V21-V61-V71-V81 SNAP-IN

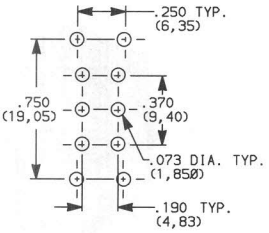
NEW



V61

SNAP-IN DESIGN RETAINS SWITCH.

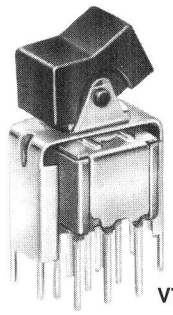
P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

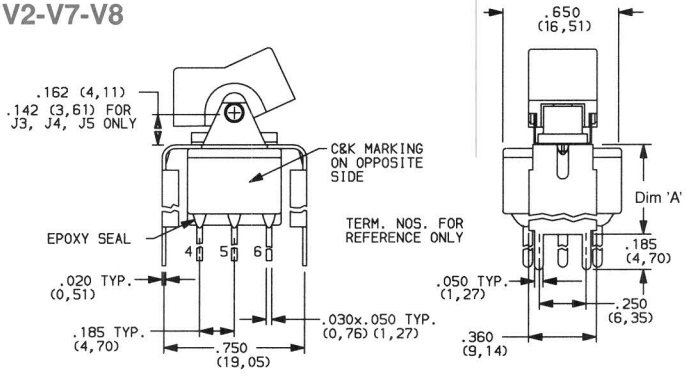
TERMINATIONS

NEW



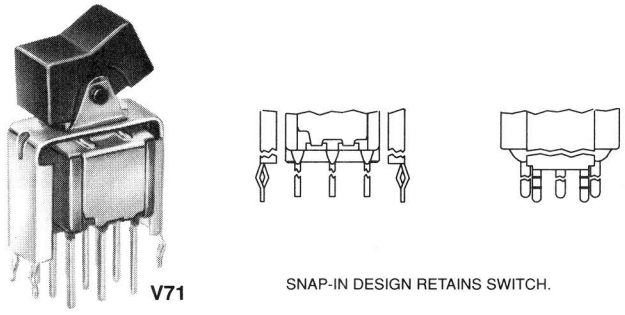
3PDT V7

V2-V7-V8



Part No. Shown: 7301J1V__BE2

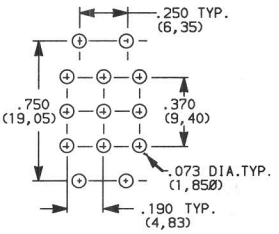
V21-V71-V81 SNAP-IN



V71

SNAP-IN DESIGN RETAINS SWITCH.

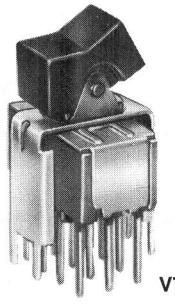
P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

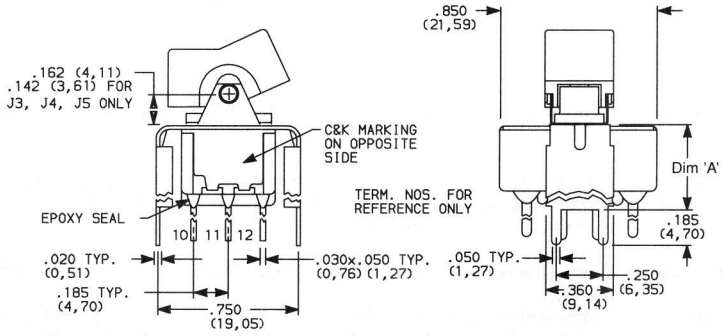
Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

NEW



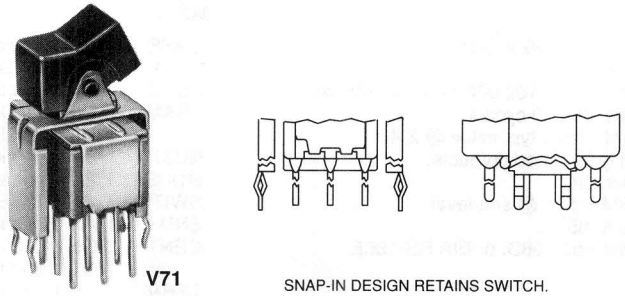
4PDT V7

V2-V7-V8



Part No. Shown: 7401J1V__BE2

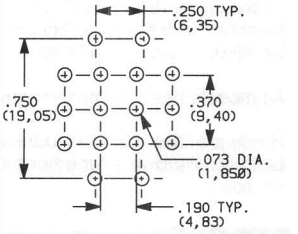
V21-V71-V81 SNAP-IN



V71

SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

Actuator shown in pos.1.
B contact material std.
Not available with I seal option.
Available actuators, see pages C-37 and C-38.

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	5 AMPS @120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @20 V AC OR DC MAX. OR 5 AMPS @120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

C

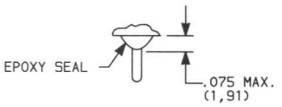
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

U11-U415 models with all options when ordered with G, L, M or Q contact material. See pages C-29 and VIII. Z termination option CSA certified only when ordered with I epoxy base seal.

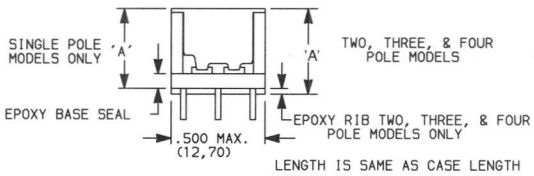
B contact material std. with all terminations except Z, C, Z3.
Q contact material std. with Z, C, Z3 terminations.
K, L, M contact materials not available with Z terminations.

SEAL

E (STD.)



I



Poles	Dim 'A'
SP	.410 (10,41)
DP	.440 (11,18)
3P	.505 (12,83)
4P	.505 (12,83)

Available with Z, C, Z3, W-W5 terminations only.

HOW TO ORDER

All available 7000 SERIES ROCKER AND LEVER HANDLE SWITCH options are listed on page C-27, and are described on pages C-29 thru C-48. Switches with standard options are shown on page C-28. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page C-29.

Hardware: two each: – mounting screws, nuts, lockwashers and standoffs for 1/8 in. thk. panel are supplied std. on switches with panel mounting bracket. Hardware for other panel thicknesses also available. Actuators, frames and mounting hardware are available separately, see catalog section H.

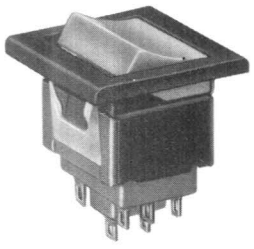
SPECIFICATIONS

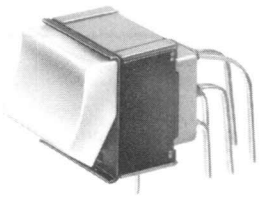
CONTACT RATING: 5 AMPS @ 120 V AC or 28 V DC; 2 AMPS @ 250 V AC (Q contact mat'l).
ELECTRICAL LIFE: 7X01 and UX1 MODELS: 100,000 make-and-break cycles at full load. All other models, 40,000 cycles.
CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30°C to 85°C.
SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

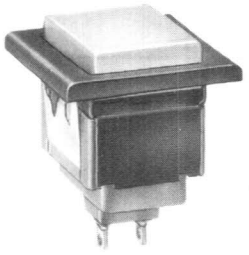
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

MATERIALS

CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP) (UL 94V-0).
ACTUATOR: Nylon, black std.
FRAME – FRONT MOUNT: Nylon, black std.
REAR MOUNT: Spring steel, black std.
BUSHING: Brass or zinc, nickel plated.
HOUSING: Stainless steel.
SWITCH SUPPORT: Brass or steel, tin plated.
END CONTACTS: Coin silver, silver plated (Q contact mat'l).
CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l).
TERMINAL SEAL: Epoxy
HARDWARE: Nut, Screw, & Lockwasher – Stainless steel.
Standoff – Nylon std. Aluminum avail., consult factory.



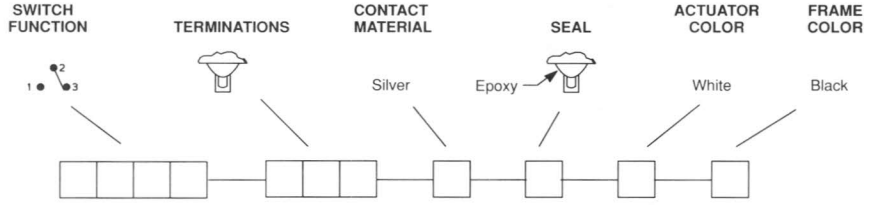




models available, see page D-18.

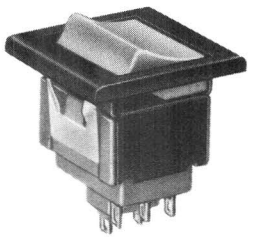
Easy Build-A-Switch:

Below is a complete listing of available options for 5000 SERIES ILLUMINATED ROCKER SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page C-50; all available options are shown and described on pages C-50 thru C-53. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-52. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.



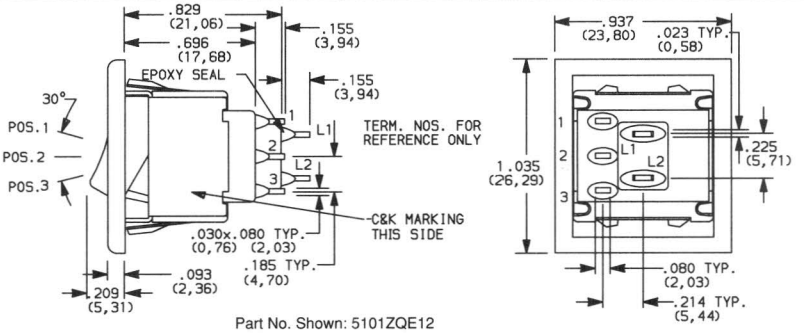
SWITCH FUNCTION	TERMINATIONS	CONTACT MATERIAL	SEAL	ACTUATOR COLOR	FRAME COLOR
5101	AV2	B	E	1	(NONE)
5103	C	G		3	1
5105	W	Q		4	2
5107	W1			5	3
5108	W3			6	4
5201	W4				5
5203	Z				6
5205	Z3				7
5207					8
5208					9
5211					
5213					
5215					
5600					
L11					
L13					
L15					
L17					
L18					
L21					
L23					
L25					
L27					
L28					

SWITCHES WITH STANDARD OPTIONS

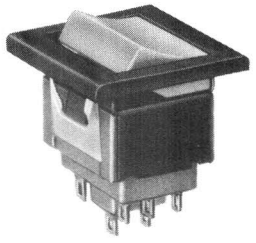


SPDT

Actuator and frame supplied not installed.

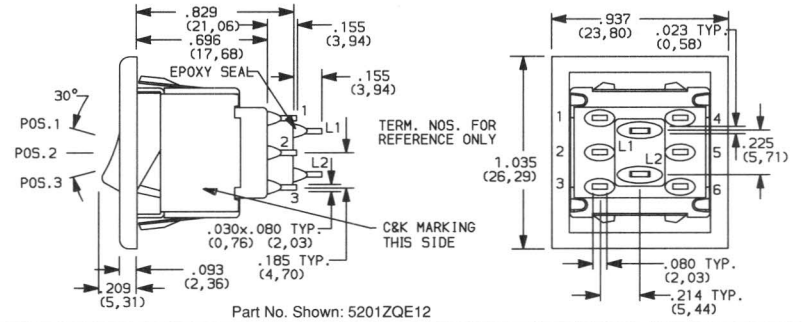


Part No. Shown: 5101ZQE12



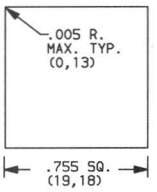
DPDT

Actuator and frame supplied not installed.



Part No. Shown: 5201ZQE12

PANEL MOUNTING



PANEL THICKNESS
.062 TO .125
(1,57) (3,18)

C

SWITCH FUNCTION

NO. POLES	MODEL NO.	UL/CSA MODEL** NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	5101	L11	ON	NONE	ON	2-3	OPEN	2-1	 SPDT
	5103	L13	ON	OFF	ON				
	5105	L15	MOM.	OFF	MOM.				
	5107	L17	ON	OFF	MOM.				
	5108	L18	ON	NONE	MOM.				
DP	5201	L21	ON	NONE	ON	2-3,5-6	OPEN	2-1,5-4	 DPDT
	5203	L23	ON	OFF	ON				
	5205	L25	MOM.	OFF	MOM.				
	5207	L27	ON	OFF	MOM.				
	5208	L28	ON	NONE	MOM.				
	5211 *	5211 *	ON	ON	ON	2-3,5-6	2-3,5-4	2-1,5-4	
	5213 *	5213 *	ON	ON	MOM.				
	5215 *	5215 *	MOM.	ON	MOM.				

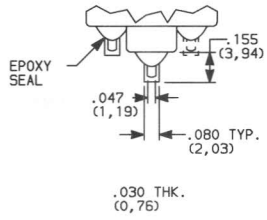
MOM=MOMENTARY

* Wiring for 3-way switch, see page X.

** L11-L28, 5211-5215 model nos. with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

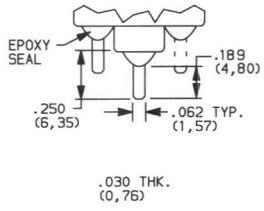
TERMINATIONS

Z (STD.)



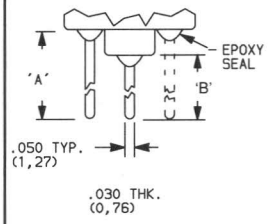
SPDT and DPDT Q contact material std.

Z3 QUICK CONNECT



SPDT and DPDT Q contact material std. Mating quick connector available; order part no. 530100000.

W-W1-W3-W4 WIRE-WRAP

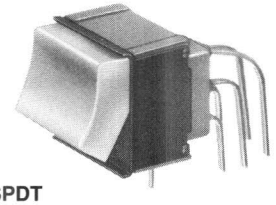


Option	Dim 'A'	Dim 'B'
W	.750 (19,05)	.612 (15,54)
W1	.964 (24,48)	.826 (20,98)
W3	.425 (10,80)	.287 (7,29)
W4	1.062 (26,97)	.924 (23,47)

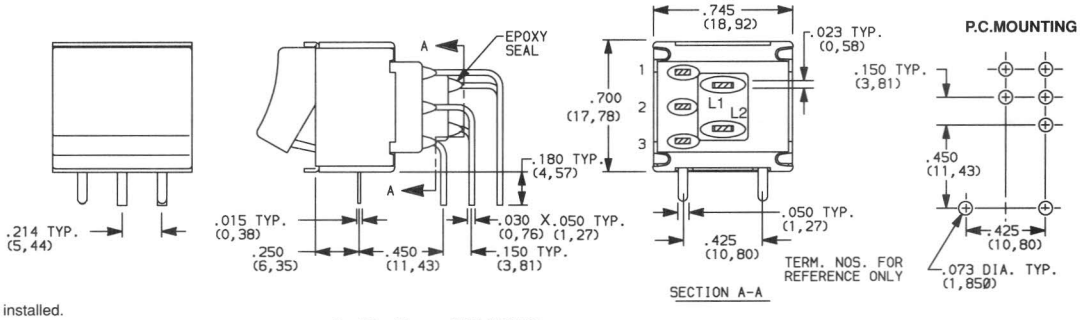
Note: W3 replaces C1.

SPDT and DPDT B contact material std.

AV2



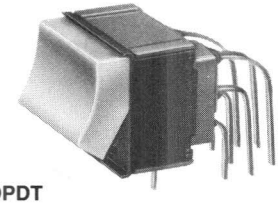
SPDT



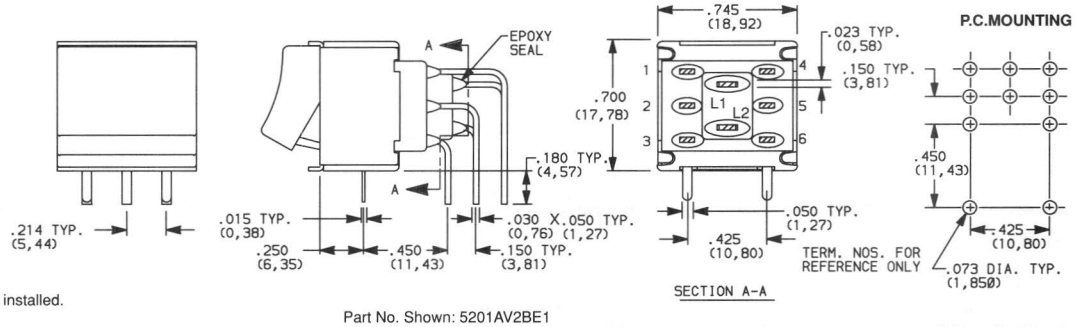
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1, actuator supplied not installed.
B contact material std.

Part No. Shown: 5101AV2BE1

AV2



DPDT



Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1, actuator supplied not installed.
B contact material std.

Part No. Shown: 5201AV2BE1

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
Q	SILVER [4,5]	SILVER 5	POWER	5 AMPS @120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.
G	GOLD OVER SILVER [2,3]	GOLD 3	LOW LEVEL/DRY CIRCUIT OR POWER	0.4 VA MAX. @20 V AC OR DC MAX. OR 5 AMPS @120 V AC OR 28 V DC; 2 AMPS @ 250 V AC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

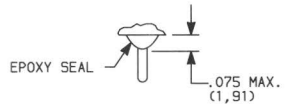
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.

Q contact material std. with Z, Z3 terminations.
B contact material std. with AV2, W-W4 terminations.

L11-L28, 5211-5215 model nos. with all options when ordered with G or Q contact material.
See pages C-50 and VIII.

SEAL

E (STD.)



ACTUATOR COLOR

OPTION CODE	ACTUATOR COLOR
1	WHITE (std.)
3	RED
4	ORANGE (AMBER)
5	YELLOW
6	GREEN

Select actuator color from chart. Place option code in appropriate box of ordering format. Actuator finish: gloss. Custom markings and legends available, consult factory. Actuators supplied not installed. Actuators are available separately, see catalog section H.

FRAME COLOR

OPTION CODE	FRAME COLOR
(NONE)	WITH AV2 TERMS.
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select frame color (if required) from chart. Place option code in appropriate box of ordering format. Frame finish: matte. Custom markings and legends available, consult factory. Frames supplied not installed. Frames are available separately, see catalog section H.

HOW TO ORDER

All available 5000 SERIES ILLUMINATED ROCKER SWITCH options are listed on page C-49, and are described on pages C–50 thru C–52. Switches with standard options are shown on page C-50. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' P.C. board cleaning methods. models available, see page C-50. Actuators and frames are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING: 5 AMPS @ 120 V AC or 28 V DC; 2 AMPS @ 250 V AC. (Q contact mat'l).
ELECTRICAL LIFE: 100,000 make-and-break cycles at full load on 5X01 and LX1 models. All other models, 40,000 cycles.
CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30°C to 85°C.
SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

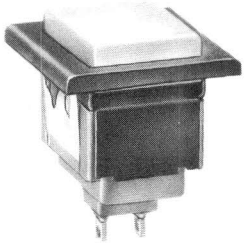
MATERIALS

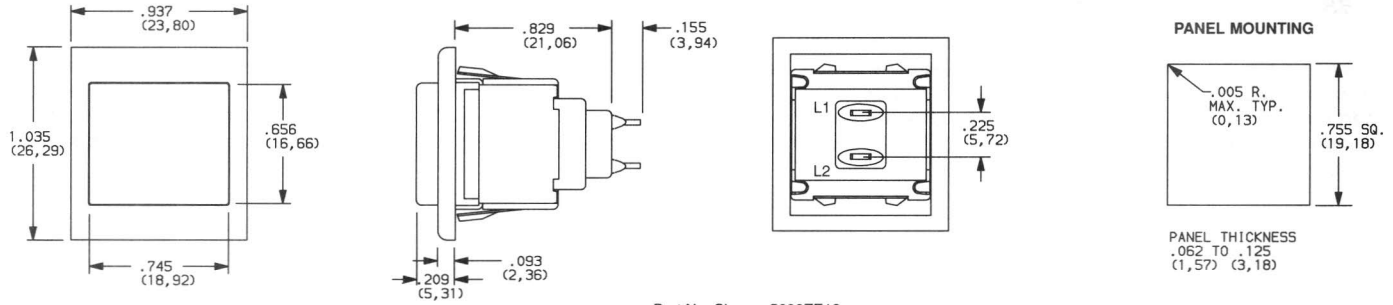
CASE: Diallyl phthalate (DAP) (UL 94V-0).
ACTUATOR: Translucent polycarbonate, white std.
FRAME: Nylon, black std.
HOUSING: Stainless steel, black passivate.
MOUNTING SPRING: Spring steel, nickel plated.
END CONTACTS: Coin silver, silver plated. (Q contact mat'l).
CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l).
LAMP SOCKET TERMINALS: Copper alloy, tin plated.
TERMINAL SEAL: Epoxy

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

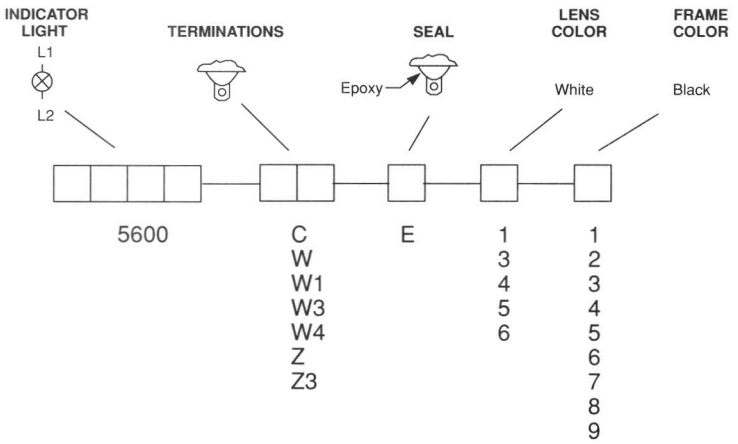
LAMP INFORMATION

Lamps are not supplied. Midget screw base lamps sizes T 1 1/2 and T 1 3/4 are recommended. Suggested spherical candlepower range is .34 - .75 M.S.C.P. Instrument grade lamps are recommended for dimensional consistency. Max. overall length= .635 (16,13), max. OD= .200 (5,08). Lamps are easily replaceable from front, no special tools are required.





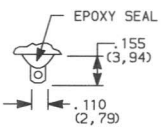
Part No. Shown: 5600ZE12



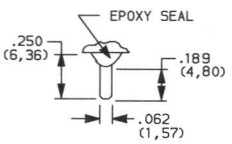
Shown is a complete listing of available options for 5600 SERIES INDICATOR LIGHTS. Build-A-Switch allows you to mix and match options to create the indicator you need – simply select desired termination, lens color and frame color below. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Lens and frame are available separately, see catalog section H. Bulbs not furnished. See lamp information page C-52. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

TERMINATIONS

Z SOLDER

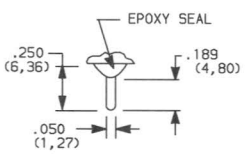


Z3 QUICK CONNECT

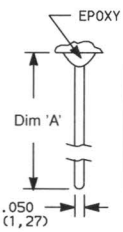


All terminations .030 (0,76) thk.

C P.C.



W-W1-W3-W4 WIRE WRAP



Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)

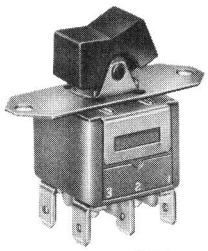
LENS COLORS

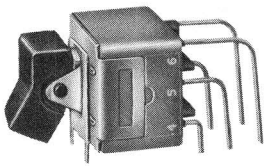
OPTION CODE	LENS COLOR
1	WHITE (std.)
3	RED
4	ORANGE (AMBER)
5	YELLOW
6	GREEN

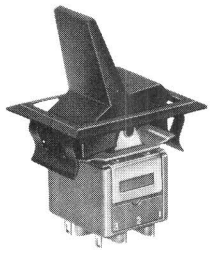
FRAME COLORS

OPTION CODE	FRAME COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Lens and frame supplied not installed.





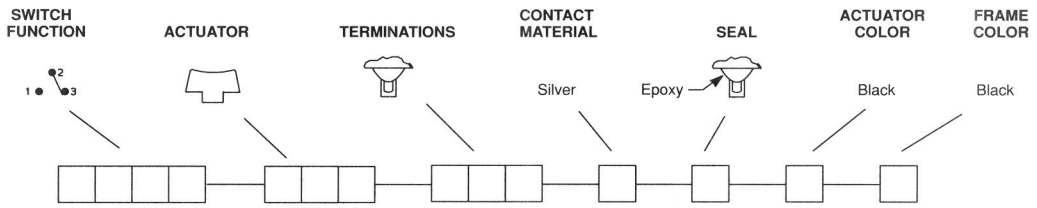


All 9000 Series models meet international dimensional and electrical requirements.

Easy Build-A-Switch:

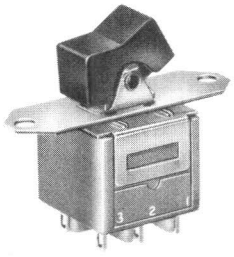
Below is a complete listing of available options for 9000 SERIES POWER ROCKER AND LEVER HANDLE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page C-55; all available options are shown and described on pages C-55 thru C-60. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page C-60. Hardware and accessories are available separately, see catalog section H.

C

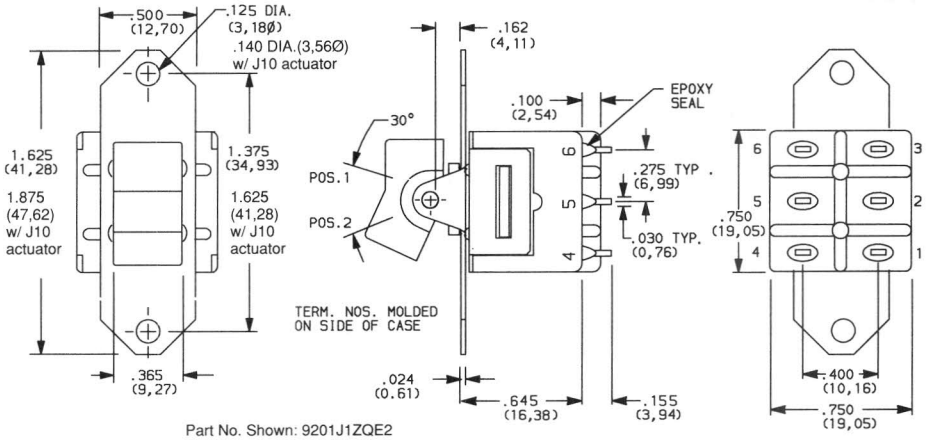


SWITCH FUNCTION	ACTUATOR	TERMINATIONS	CONTACT MATERIAL		SEAL	ACTUATOR COLOR	FRAME COLOR
9201	J1	AV2	Q		E	1	(NONE)
9221	J2	C			D	2	1
	J3	W				3	2
	J4	W1				4	C
	J5	W3				5	S
	J10	W4				6	
	J19	W5				7	
	J37	Z				8	
	J47	Z3				9	
	J50	Z4					
	J57						
	J60						
	J90						

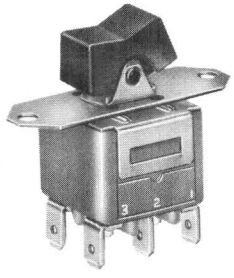
SWITCHES WITH STANDARD OPTIONS



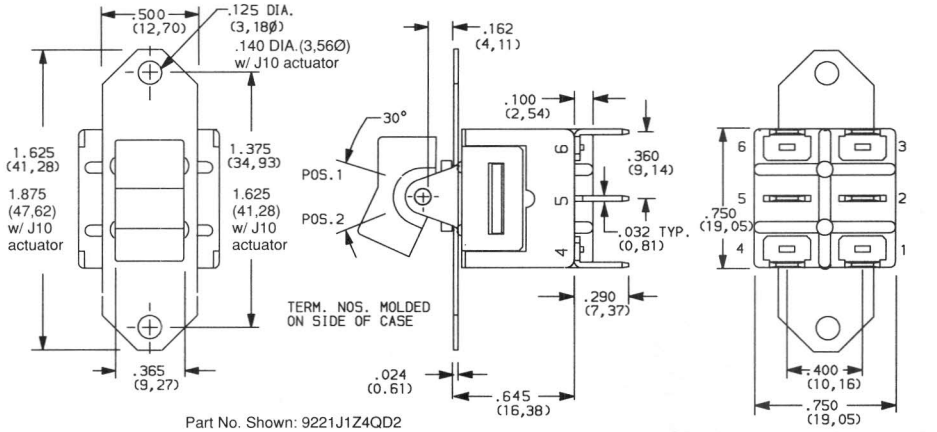
DPDT
6 AMP MODEL



Part No. Shown: 9201J1ZQE2



DPDT
10 AMP MODEL



Part No. Shown: 9221J1Z4QD2

C

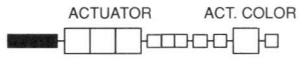
SWITCH FUNCTION

NO. POLES	MODEL NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	SCHEMATIC
DP	9201	ON	ON	2-3,5-6	2-1,5-4	DPDT
	9221	ON	ON			

All 9000 Series models meet international dimensional and electrical requirements.

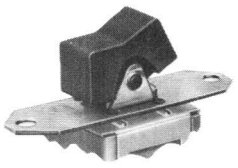
9221 model must be ordered with Z4 terminations and D seal option.

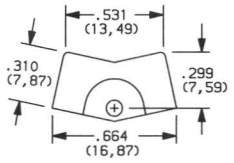
ACTUATORS – PANEL MOUNT

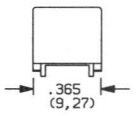


C

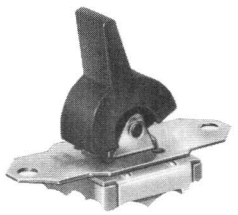
J1 (STD.)

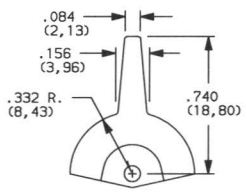


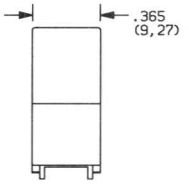




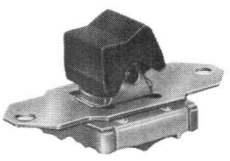
J2

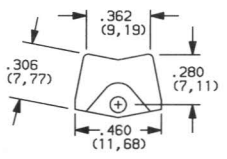


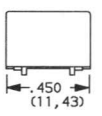




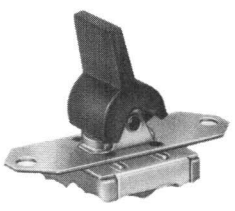
J50

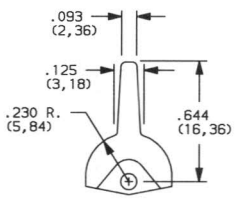






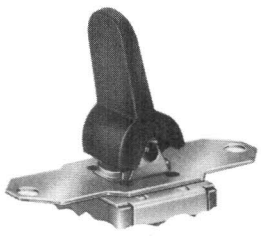
J60

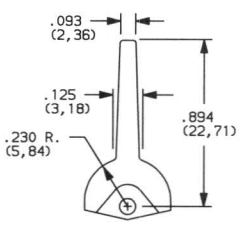


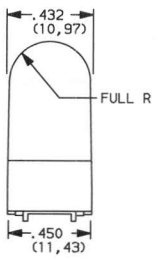




J90





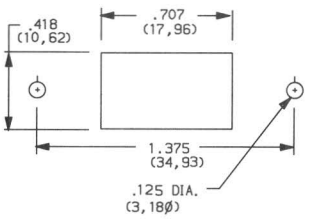


ACTUATOR COLOR

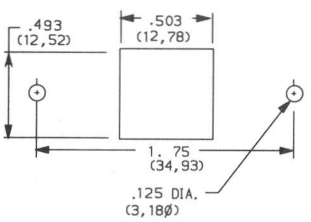
OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select actuator color from chart. Place option code in appropriate box of ordering format. Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-60. Hardware is available separately, see catalog section H.

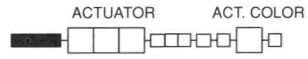
PANEL MOUNTING J1 – J2



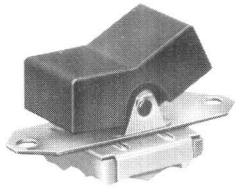
PANEL MOUNTING J50 – J60 – J90

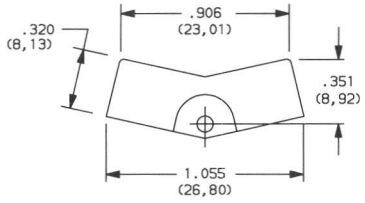


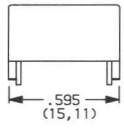
ACTUATORS – PANEL MOUNT



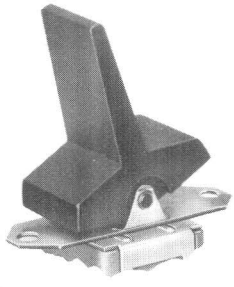
J3

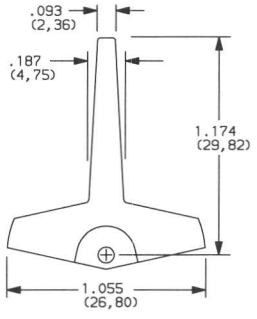


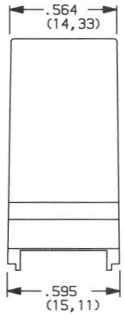




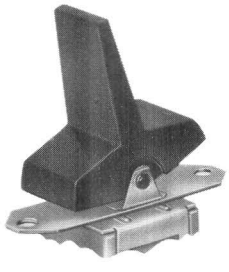
J4

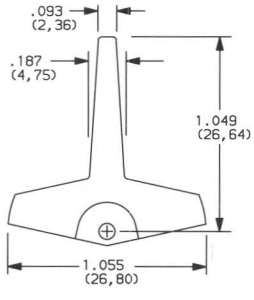


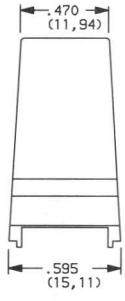




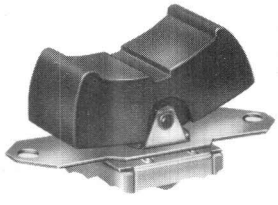
J5

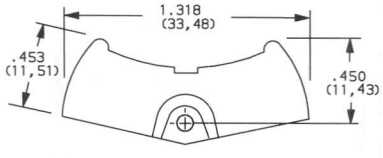


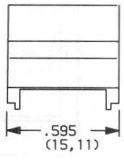




J10





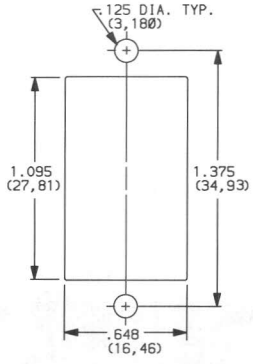


ACTUATOR COLOR

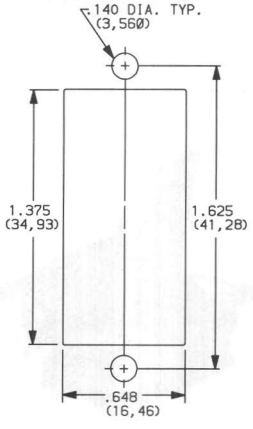
OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select actuator color from chart. Place option code in appropriate box of ordering format.
Finish: matte. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page C-60. Hardware is available separately, see catalog section H.

PANEL MOUNTING J3 – J4 – J5

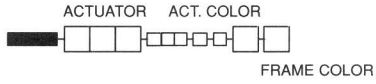


PANEL MOUNTING J10



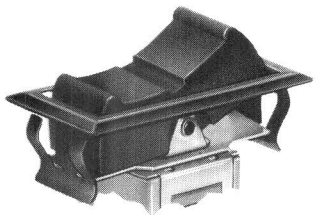
C

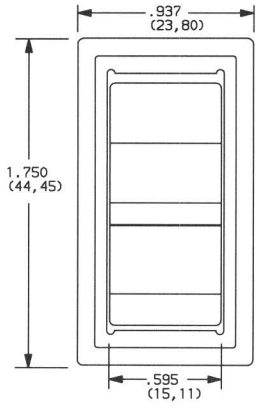
ACTUATORS – REAR MOUNT

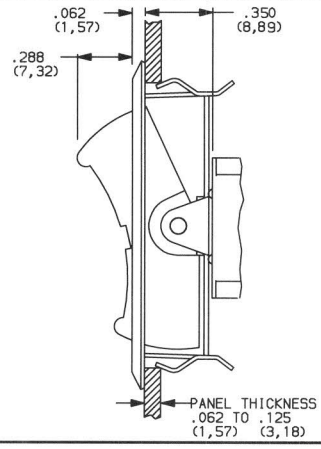


C

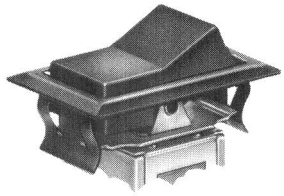
J19

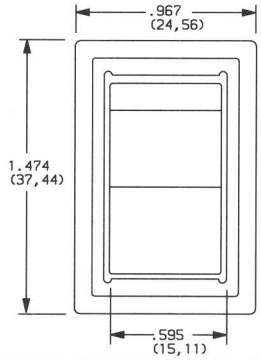


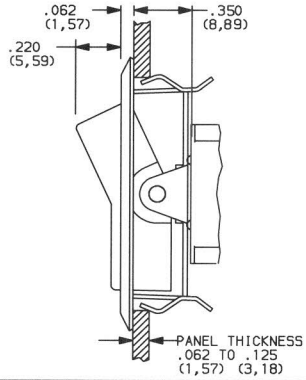




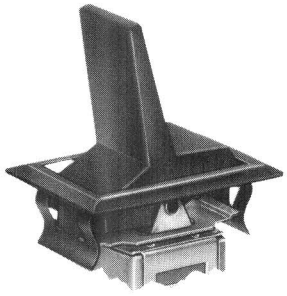
J37

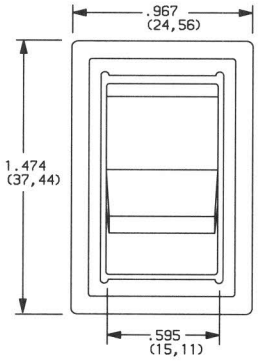


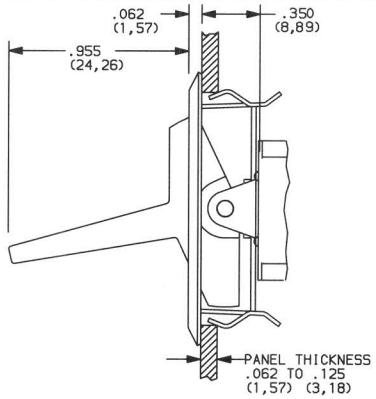




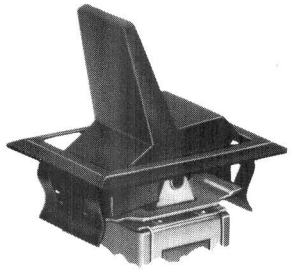
J47

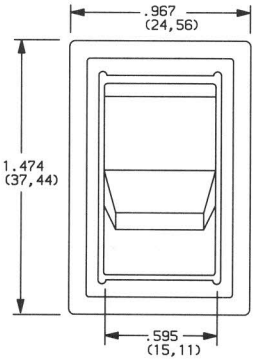


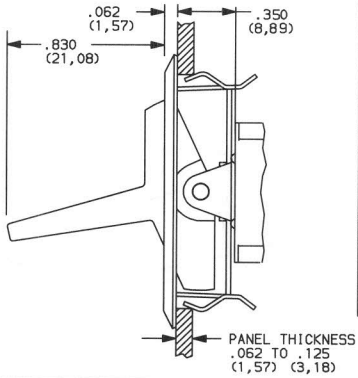




J57







ACTUATOR COLOR

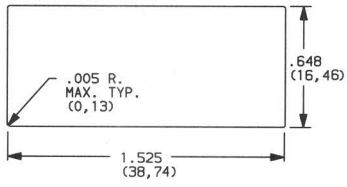
OPTION CODE	ACTUATOR COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

FRAME COLOR

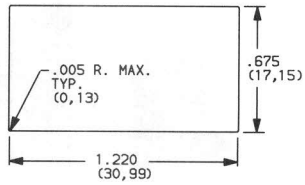
OPTION CODE	FRAME COLOR
1	WHITE
2	BLACK (std.)
C	BRIGHT CHROME
S	SATIN CHROME

Select actuator and frame colors from respective charts. Place option codes in appropriate boxes of ordering format. Actuator finish: matte. Frame finish: gloss. Custom actuator markings and legends available, consult factory. Frames are available separately, see catalog section H.

PANEL MOUNTING – J19

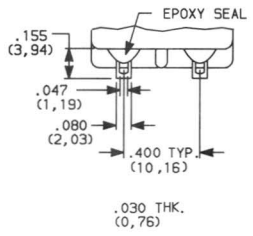


PANEL MOUNTING – J37 – J47 – J57



TERMINATIONS

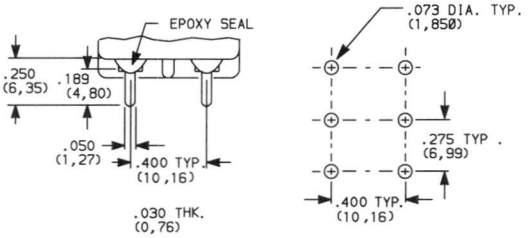
Z (STD.)



9201 MODEL ONLY

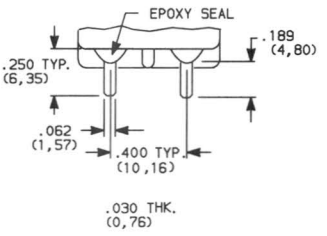
C

P.C. MOUNTING



9201 MODEL ONLY

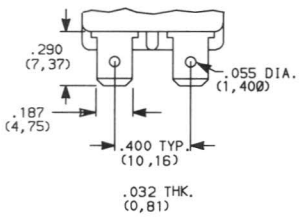
Z3 QUICK CONNECT



9201 MODEL ONLY

Mating quick connector available; order part no. 530100000.

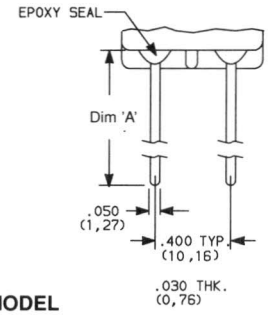
Z4 QUICK CONNECT



9201 and 9221

Only termination available with 9221 model.
Must be ordered with D seal option.
Mating quick connector available from:
Hollingsworth Solderless Terminals, Phoenixville, PA 19460 or
AMP Special Industries, Harrisburg, PA 17105

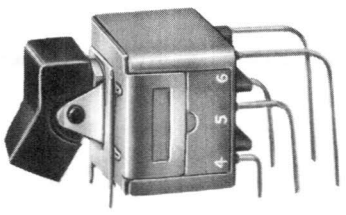
W-W1-W3-W4-W5 WIRE WRAP

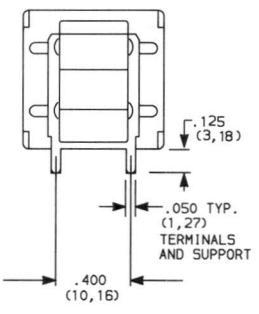


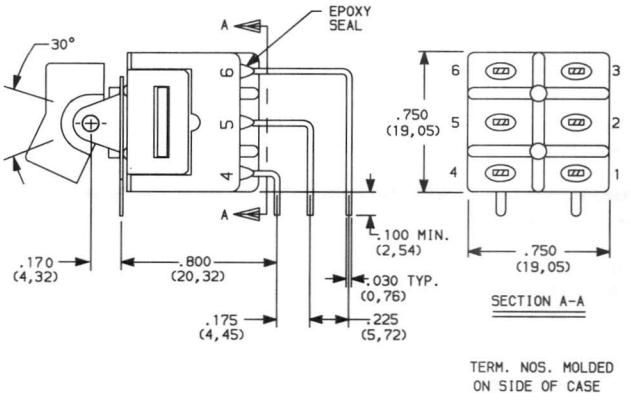
Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

9201 MODEL ONLY

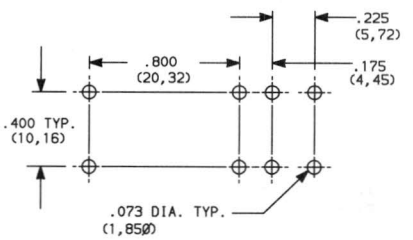
AV2







P.C.MOUNTING



9201 MODEL ONLY

Term. bend radii and lead-in mfg. option.
Term. spacing greater than 3mm at all points.
Actuator shown in pos.1.

Part No. Shown: 9201J1AV2QE2

CONTACT MATERIAL

OPTION CODE	MODEL	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
Q	9201	SILVER [1,2]	SILVER OR TIN [2, 5]	POWER	6 AMPS @120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
	9221	SILVER CADMIUM OXIDE [3,4]	TIN [5]		10 AMPS @125 V AC OR 28 V DC; 5 AMPS @ 250 V AC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] END CONTACTS: Coin silver, silver plated.
[2] CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
[3] END CONTACTS: Silver cadmium oxide.
[4] CENTER CONTACT: Copper alloy, silver plated.
[5] Z4 TERMINALS ONLY: Copper alloy, tin plated.

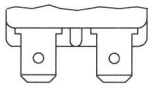
All 9000 Series models meet international dimensional and electrical requirements. See pages C-55 and VIII.

9221 model must be ordered with Z4 terminations and D seal option.

C

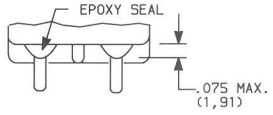
SEAL

D NO SEAL



Must be ordered with 9221 model and Z4 terminations.
Not available with any other terminations.

E



Must be ordered with all terminations except Z4.
Not available with 9221 model or Z4 terminations.

HOW TO ORDER

All available 9000 SERIES POWER ROCKER AND LEVER HANDLE SWITCH options are listed on page C-54, and are described on pages C-55 thru C-60. Switches with standard options are shown on page C-55. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All 9000 Series models meet international dimensional and electrical requirements.

Hardware: two each – mounting screws, nuts, lockwashers ans standoffs for 1/8 in. thk. panel are supplied std. on switches with panel mounting bracket. Hardware and accessories available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
9201 MODEL: 6 AMPS @ 120 V AC or 28 V DC; 3 AMPS @ 250 V AC.
9221 MODEL: 10 AMPS @ 125 V AC or 28 V DC; 5 AMPS @ 250 V AC.
ELECTRICAL LIFE: 25,000 make-and-break cycles at full load.
CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 2,500 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30°C to 85°C.
SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

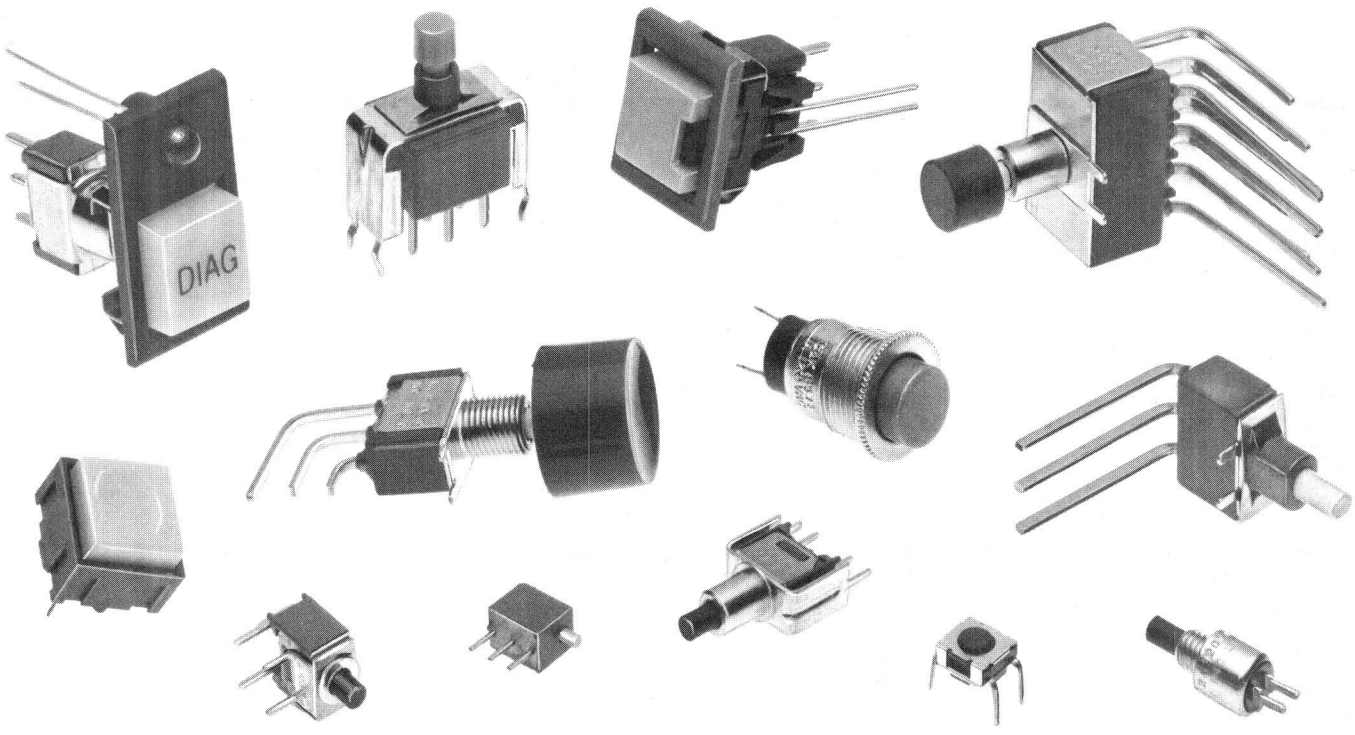
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

MATERIALS

CASE: Diallyl phthalate (DAP) (UL 94V-0).
ACTUATOR: Nylon, black std.
FRAME – REAR MOUNT OPTIONS: Spring steel, black std.
BUSHING: Brass, nickel plated.
HOUSING: Stainless steel.
SWITCH SUPPORT: Brass or steel, tin plated.
MOUNTING BRACKET: Stainless steel.
END CONTACTS:
9201 MODEL: Coin silver, silver plated.
9221 MODEL: Silver cadmium oxide.
CENTER CONTACTS: Copper alloy, silver plated.
ALL TERMINALS:
9201 MODEL: Copper alloy, silver plated.
9221 MODEL: Copper alloy, tin plated.
TERMINAL SEAL: Epoxy
HARDWARE: Nut, Screw, & Lockwasher – Stainless Steel.
Standoff – Nylon std. Aluminum avail., consult factory.

SECTION D

PUSHBUTTON SWITCHES



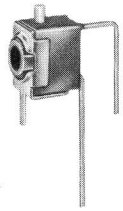
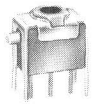
GP Series	Sealed Ultra-Miniature Pushbutton Switches	D-2 thru D-3
EP Series	Sealed Tiny Pushbutton Switches	D-4 thru D-9
TP Series	Tiny Pushbutton Switches	D-10 thru D-16
E010 Series	Sealed Momentary Pushbutton Switches	D-17 thru D-22
E020 Series	Sealed Snap-Acting Momentary Pushbutton Switches	D-23 thru D-30
8020 Series	Snap-Acting Momentary Pushbutton Switches	D-31 thru D-46
8060 Series	Alternate Action and Momentary Pushbutton Switches	D-47 thru D-56
8600 Series	Microminiature Pushbutton Switches	D-57 thru D-58
8500 Series	Subminiature Pushbutton Switches	D-59 thru D-62
KT Series	Sealed Miniature Key Switches	D-63
KS Series	Pushbutton Key Switches	D-64 thru D-66

GP Series

Sealed* Ultra-Miniature Pushbutton Switches

* Process sealed – withstands soldering and cleaning processes.



- **FOUR P.C. TERMINAL STYLES – .100 IN. TERMINAL SPACING.**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**
- **SPST AND SPDT MOMENTARY MODELS AVAILABLE.**
- **PROCESS COMPATIBLE – WITHSTANDS MACHINE SOLDERING TEMPERATURES AND PRESSURE WASH CLEANING METHODS – HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **SEALED CONSTRUCTION – INTERNAL ACTUATOR SEAL, EPOXY BASE SEAL.**

D

SP MODELS WITH C TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GP11MCKE	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 • • 3	
GP12MCKE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic SPDT	NC 1 • 2 (COMM) • 3 NO	

MOM. = MOMENTARY

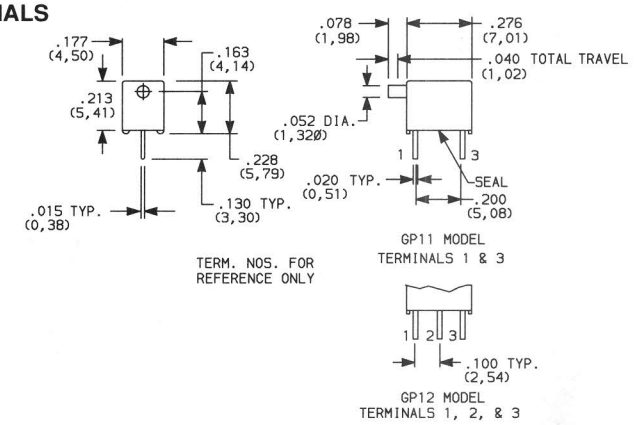


GP11 SPST



GP12 SPDT

SPST and SPDT



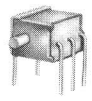
SP MODELS WITH A TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GP11MAKE	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 • • 3	
GP12MAKE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic SPDT	NC 1 • 2 (COMM) • 3 NO	

MOM. = MOMENTARY

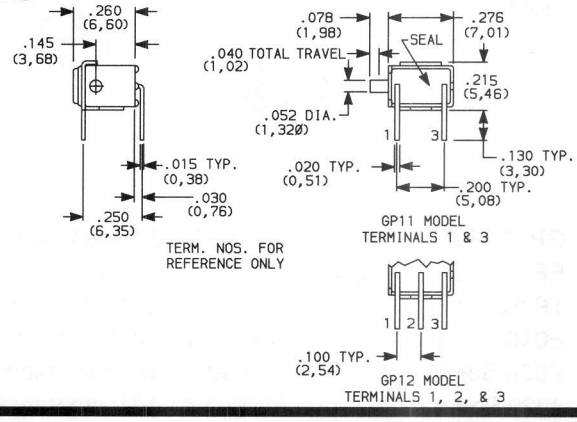


GP11 SPST



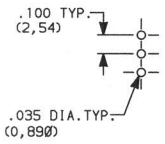
GP12 SPDT

SPST and SPDT



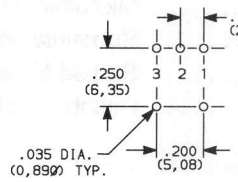
P.C. MOUNTING

C TERMINAL STYLE



GP11 - omit center hole.

A TERMINAL STYLE



GP11 - omit center hole 2.

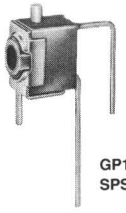
Sealed* Ultra-Miniature Pushbutton Switches

* Process sealed – withstands soldering and cleaning processes.

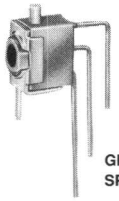
SP MODELS WITH AV TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GP11MAVKE	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 • • 3	
GP12MAVKE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic SPDT	NC 1 • 2 (COMM) • 3 NO	

MOM. = MOMENTARY

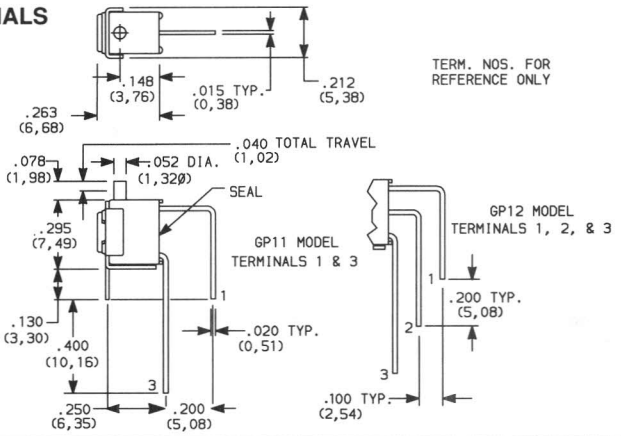


GP11 SPST



GP12 SPDT

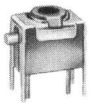
SPST and SPDT



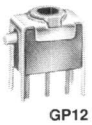
SP MODELS WITH V3 TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GP11MV3KE	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 • • 3	
GP12MV3KE	ON	MOM.
Conn. Terms.	2-1	2-3
Schematic SPDT	NC 1 • 2 (COMM) • 3 NO	

MOM. = MOMENTARY

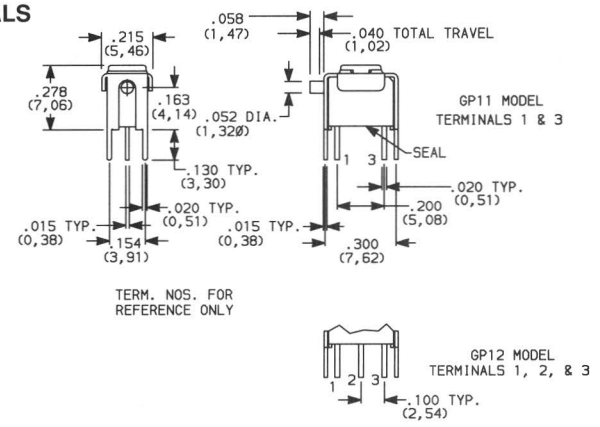


GP11 SPST



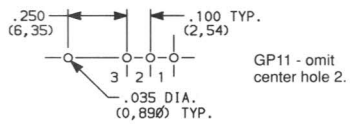
GP12 SPDT

SPST and SPDT

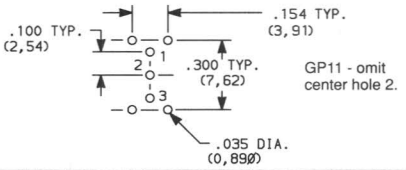


P.C. MOUNTING

AV TERMINAL STYLE



V3 TERMINAL STYLE



D

HOW TO ORDER

Complete part numbers for GP SERIES SEALED ULTRA-MINIATURE PUSHBUTTON SWITCHES are shown on pages D-2 and D-3. Additional GP Series surface mount models – see catalog section A, pages A-8 thru A-10.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.

MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30° C to 85° C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

HOUSING & BASE: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0), with standard internal o-ring seal.

SWITCH SUPPORT: Brass, tin plated.

MOVABLE CONTACT: Beryllium copper with gold plate over nickel plate.

STATIONARY CONTACTS: Copper alloy, with gold plate over nickel plate.

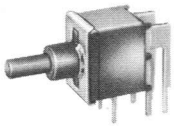
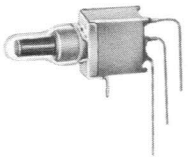
TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

TERMINAL SEAL: Epoxy. All terminals insert molded.

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

Sealed* Tiny Pushbutton Switches

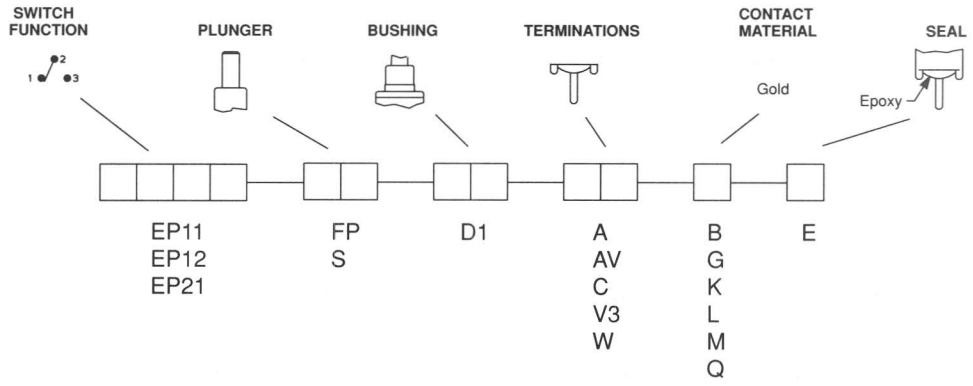
* Process sealed – withstands soldering and cleaning processes.


models available, see page D-5.

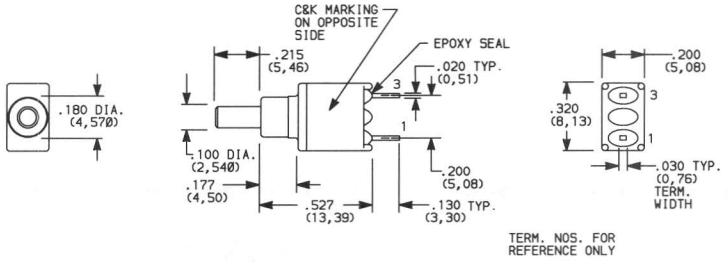
Easy Build-A-Switch:

Below is a complete listing of available options for EP SERIES SEALED TINY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page D-5; all available options are shown and described on pages D-5 thru D-9. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-9. Actuator caps available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. Additional EP Series surface mount models – see catalog section A, page A-16.



SWITCHES WITH STANDARD OPTIONS

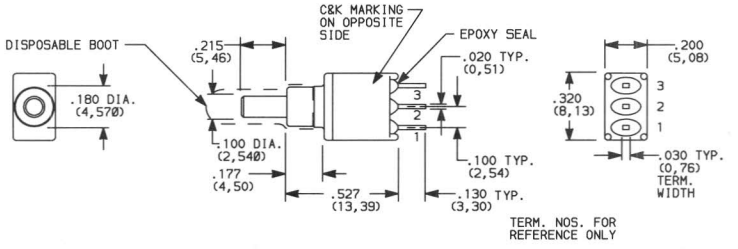




SPST

Part No. Shown: EP11SD1CBE

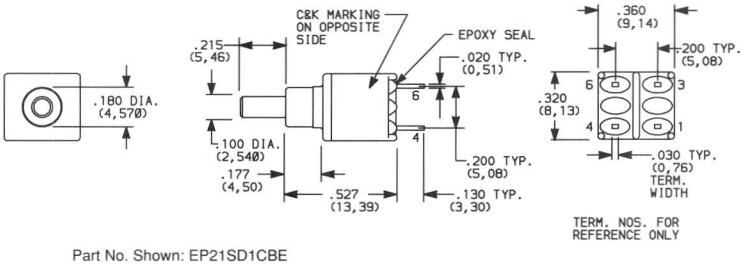




SPDT

Part No. Shown: EP12SD1CBE





DPST

Part No. Shown: EP21SD1CBE

D

SWITCH FUNCTION

NO. POLES	MODEL** NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	SCHEMATIC
SP	EP11	OFF	MOM.	OPEN	1-3	SPST 1 3
	EP12	ON	MOM.	2-1	2-3	SPDT 2 (COMM) NC 1 3 NO
DP	EP21	OFF	MOM.	OPEN	1-3,4-6	DPST 1 3 4 6

MOM. = MOMENTARY

** All models UL CSA when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII. (NOTE: EP12 model not CSA).

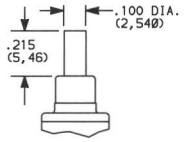
EP12 model not available with FP plunger option.

Sealed* Tiny Pushbutton Switches

* Process sealed – withstands soldering and cleaning processes.

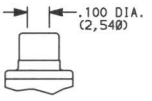
PLUNGER

S (STD.)



FP FLUSH PLUNGER

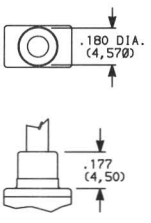
NEW



Not available on EP12 model.

BUSHING

D1 (STD.)

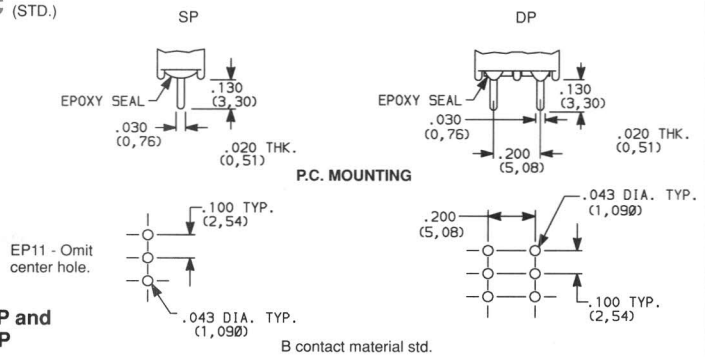


Internal actuator o-ring std.
Disposable splashproof vinyl boot over actuator and bushing supplied std. on all EP12 models, see page D-9.

D

TERMINATIONS

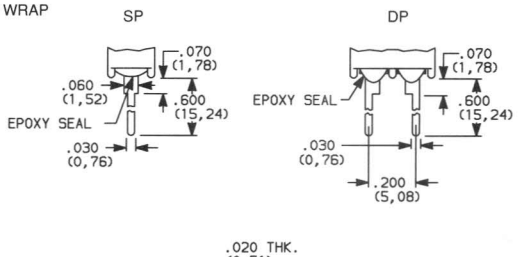
C (STD.)



SP and DP

B contact material std.

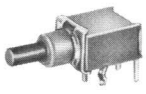
W WIRE WRAP



SP and DP

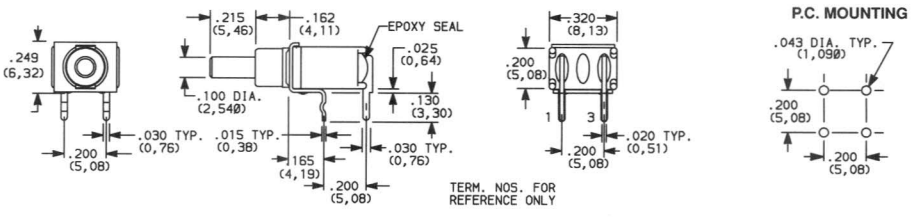
B contact material std.

A

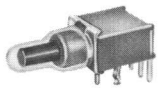


SPST
EP11 MODEL ONLY

B contact material std.

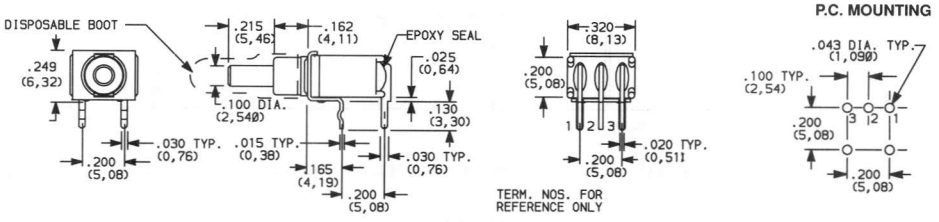


Part No. Shown: EP11SD1ABE



SPDT
EP12 MODEL ONLY

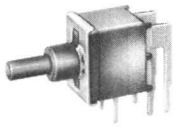
B contact material std.



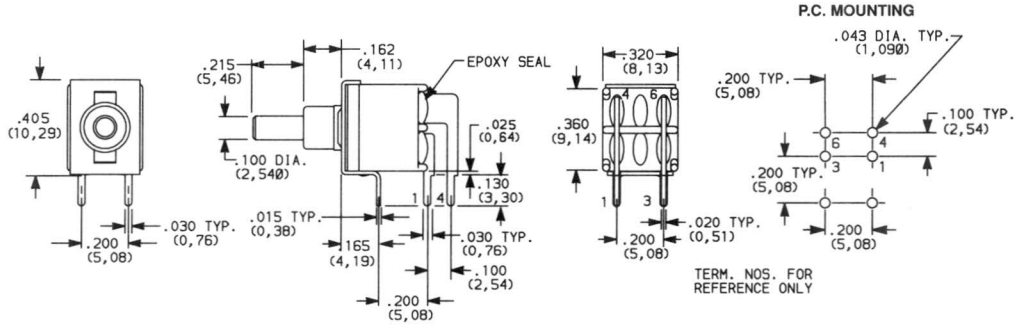
Part No. Shown: EP12SD1ABE

TERMINATIONS

A



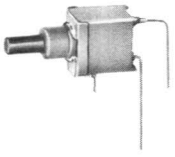
DPST



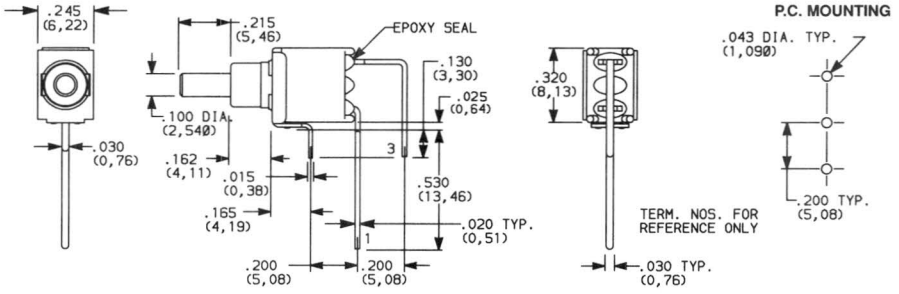
B contact material std.

Part No. Shown: EP21SD1ABE

AV

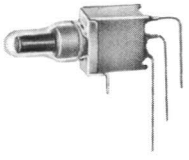


SPST
EP11 MODEL ONLY

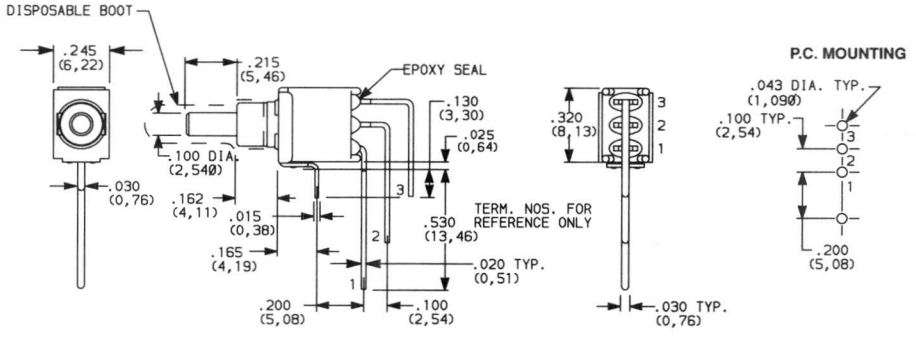


Term. bend radii and lead-in mfg. option.
B contact material std.

Part No. Shown: EP11SD1AVBE



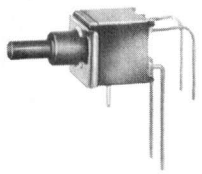
SPDT
EP12 MODEL ONLY



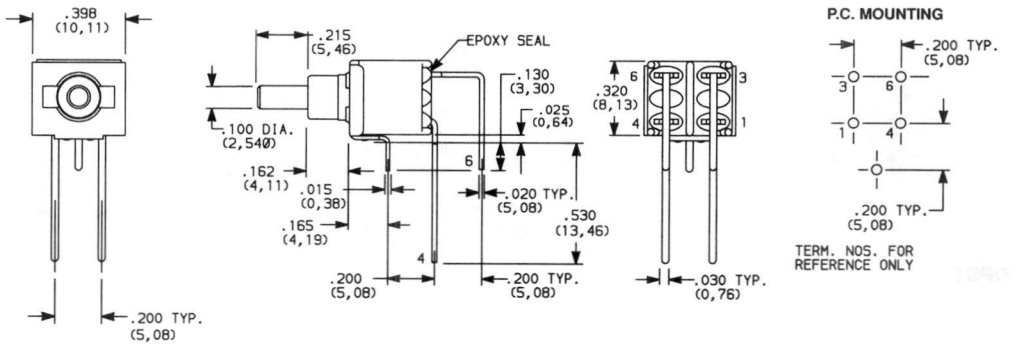
Term. bend radii and lead-in mfg. option.
B contact material std.

Part No. Shown: EP12SD1AVBE

AV



DPST



Term. bend radii and lead-in mfg. option.
B contact material std.

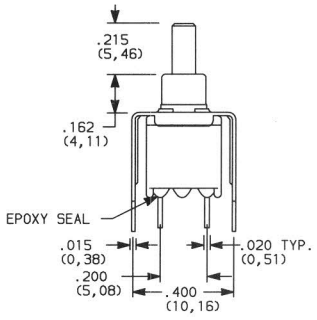
Part No. Shown: EP21SD1AVBE

D

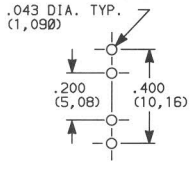
TERMINATIONS

V3





P.C. MOUNTING



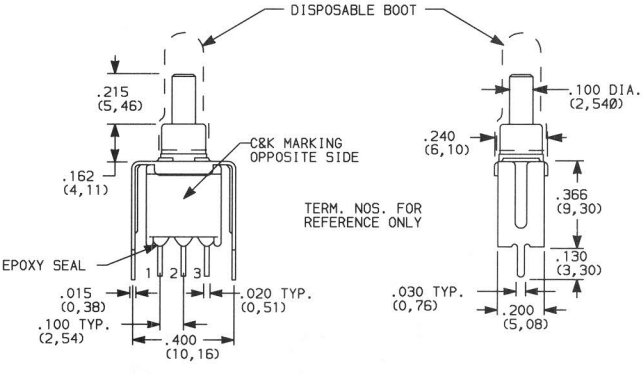
SPST
EP11 MODELS ONLY

Part No. Shown: EP11SD1V3BE

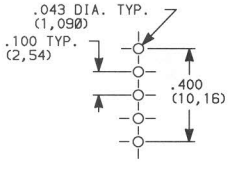
B contact material std.

D





P.C. MOUNTING



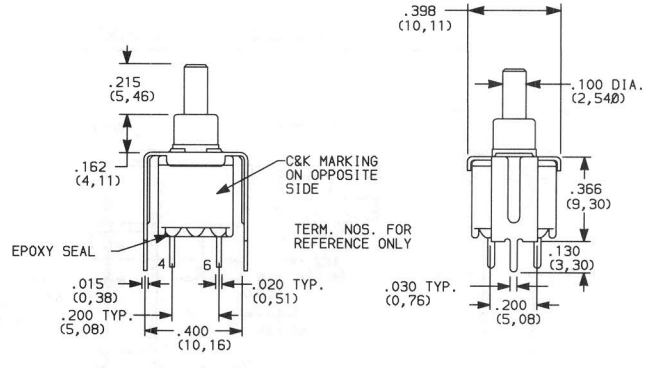
SPDT
EP12 MODELS ONLY

B contact material std.

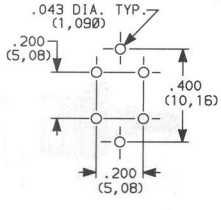
Part No. Shown: EP12SD1V3BE

V3





P.C. MOUNTING



DPST

B contact material std.

Part No. Shown: EP21SD1V3BE

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	1 AMP @120 V AC OR 28 V DC.
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @20 V AC OR DC MAX. OR 1 AMP @120 V AC OR 28 V DC.
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

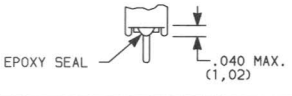
All models with all options when ordered with G, L, M or Q contact material. (NOTE: EP12 model not CSA). See pages D-5 and VIII.

B contact material std. with all terminations.

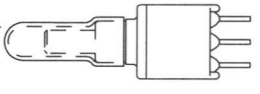
D

SEAL

E (STD.)



Disposable splashproof vinyl boot over actuator and bushing supplied std. on all EP12 models. Remove and discard boot **only after** soldering and cleaning processes are complete.



HOW TO ORDER

All available EP SERIES SEALED TINY PUSHBUTTON SWITCH options are listed on page D-4, and are described on pages D-5 thru D-9. Switches with standard options are shown on page D-5. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. models available, see page D-5. Additional EP Series surface mount models – see catalog section A, page A-16. Actuator caps available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max. (B contact mat'l).

ELECTRICAL LIFE: EP11, EP21 MODELS: 60,000 make-and-break cycles at full load.
EP12 MODEL: 30,000 cycles.

CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

PLUNGER: Thermoplastic polyester (UL 94V-0), with internal o-ring seal.

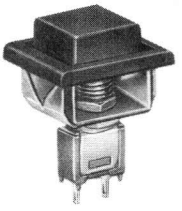
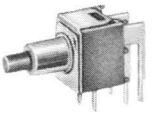
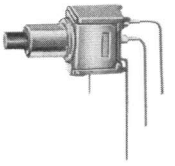
SWITCH SUPPORT: Brass, tin plated.

CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate (B contact mat'l).

TERMINAL SEAL: Epoxy.

DISPOSABLE BOOT: Vinyl splashproof boot supplied std. on EP12 model only. Remove and discard boot **only after** soldering and cleaning processes are complete.

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

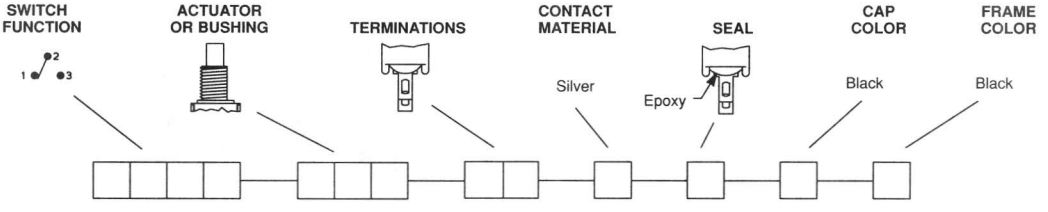





UL models available, see page D-11.

Easy Build-A-Switch:

Below is a complete listing of available options for TP SERIES TINY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page D-11; all available options are shown and described on pages D-11 thru D-16. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-16. Actuator caps, hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

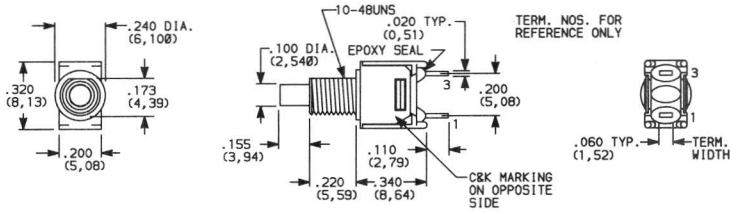
D



TP11	J80	A	B	E	(NONE)	(NONE)
TP12	J81	AV	G		1	1
TP21	J82	C	K		2	2
	SH	V3	L		3	3
	SH8	W	M		4	4
	SH9	Z	Q		5	5
	LT				6	6
	LT9				7	7
	MS9				8	8
					9	9

SWITCHES WITH STANDARD OPTIONS

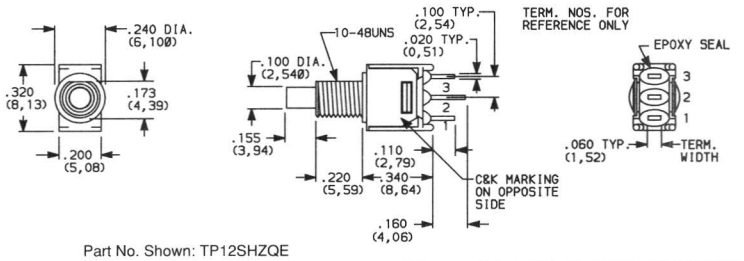




SPST

Part No. Shown: TP11SHZQE

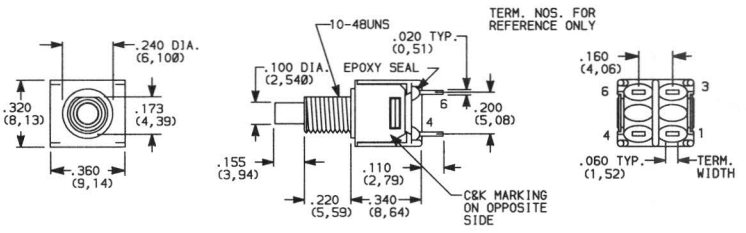




SPDT

Part No. Shown: TP12SHZQE





DPST

Part No. Shown: TP21SHZQE

D

SWITCH FUNCTION

NO. POLES	MODEL* NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	SCHEMATIC
SP	TP11	OFF	MOM.	OPEN	1-3	SPST 1 3
	TP12	ON	MOM.	2-1	2-3	SPDT NC 1, 2 (COMM), 3 NO
DP	TP21	OFF	MOM.	OPEN	1-3,4-6	DPST 1 3 4 6

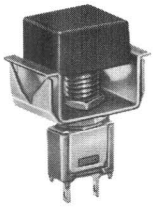
MOM. = MOMENTARY

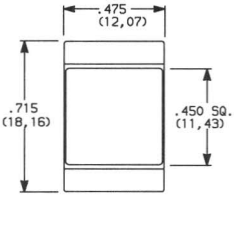
* All models UL with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

ACTUATORS – SNAP-IN FRONT MOUNT

ACTUATOR OR BUSHING | CAP COLOR | FRAME COLOR

J80

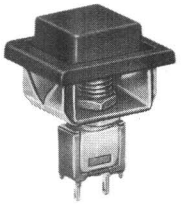


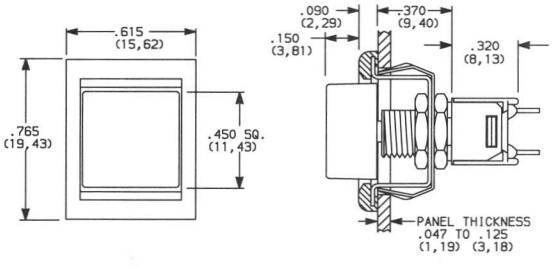


No frame color choice required.

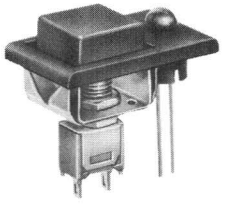
D

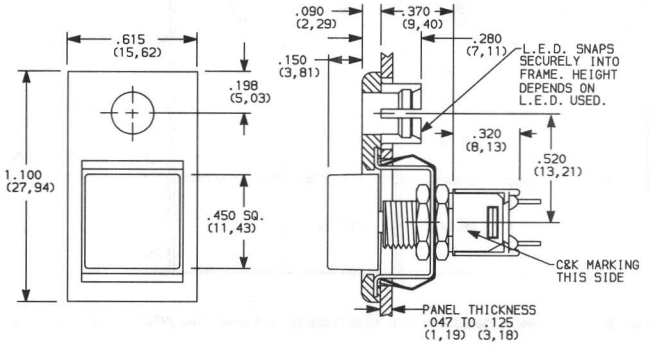
J81





J82





U.S. PATENT NO. 4,004,120
LED not included.
See page IX for LED information.

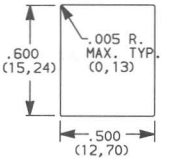
CAP AND FRAME COLORS

OPTION CODE	CAP AND FRAME COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

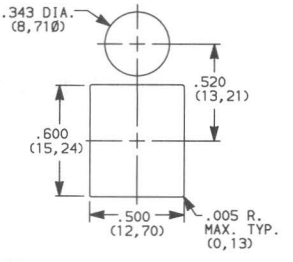
Select cap color and frame color (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

Available with Z, C, or W terminations.

PANEL MOUNTING – J80, J81



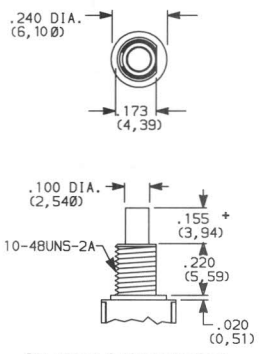
PANEL MOUNTING – J82



BUSHING

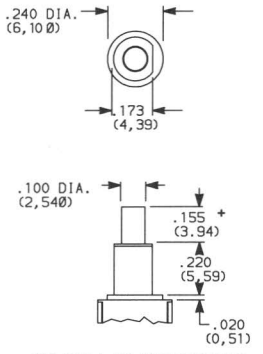
ACTUATOR OR BUSHING

SH



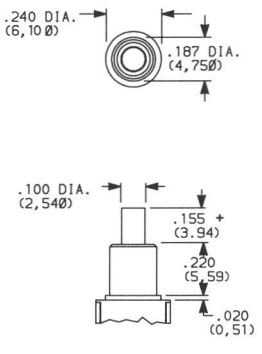
Std. with Z, C, W terminations.

SH9 UNTHREADED

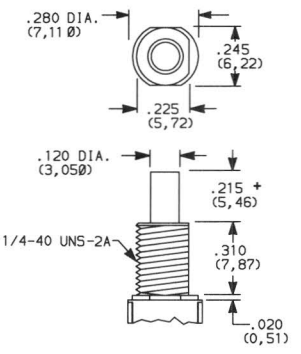


Std. with A, AV, V3 terminations.

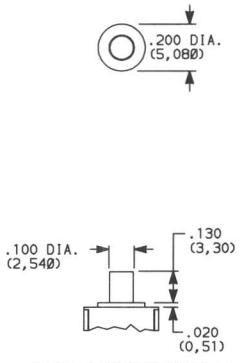
SH8 UNTHREADED



LT9 UNTHREADED
LT



MS9

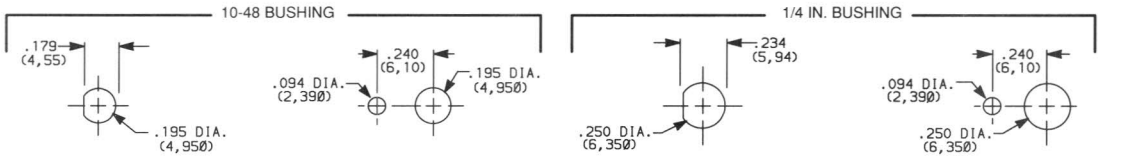


Not avail. with Z terminations.

+ Subtract .016 (0,41) for models with A, AV or V3 terminations.

PANEL MOUNTING

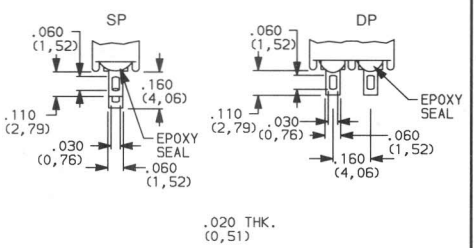
Hardware: One mounting nut, locking ring and lockwasher supplied standard with 10-48 threaded bushings (two nuts with 1/4-40 bushings). Optional mounting nut and locking ring styles and finishes available separately, see catalog section H.



WITHOUT LOCKING RING | WITH STD. LOCKING RING | WITHOUT LOCKING RING | WITH STD. LOCKING RING

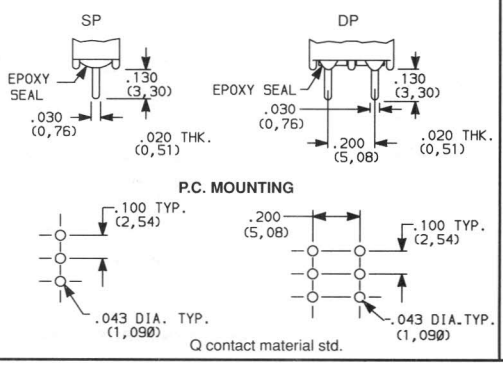
TERMINATIONS

Z (STD.)



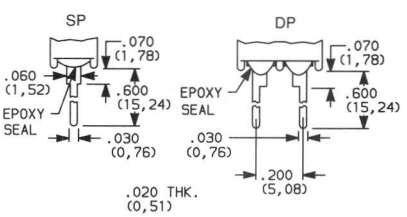
Q contact material std.
Not avail. with MS9 bushing or K, L, or M contact mat'l.

C



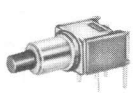
Q contact material std.

W WIRE WRAP

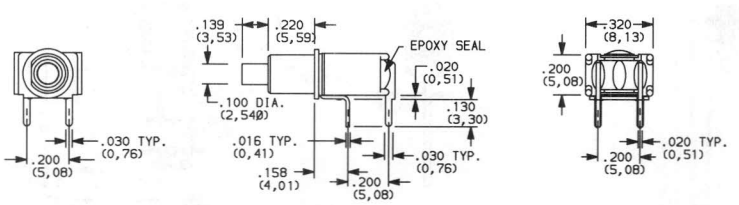


B contact material std.

A



SPST
TP11 MODEL ONLY



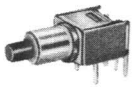
B contact material std.

Part No. Shown: TP11SH9ABE

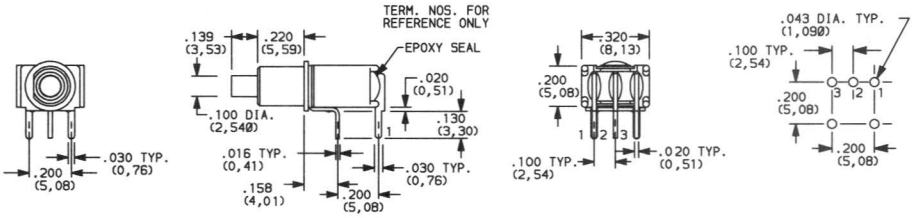
D

TERMINATIONS

A



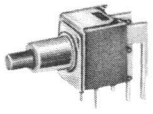
SPDT
TP12 MODEL ONLY



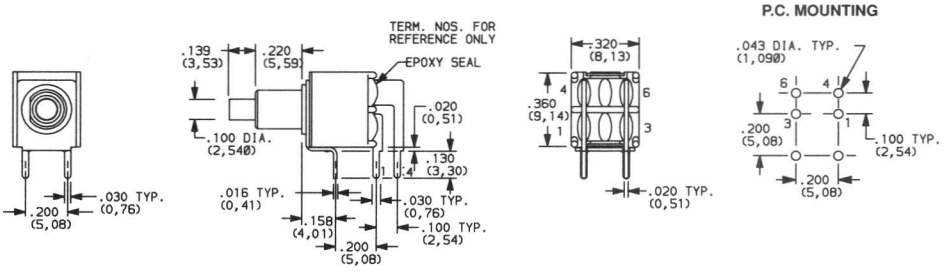
B contact material std.

Part No. Shown: TP12SH9ABE

A



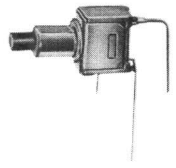
DPST



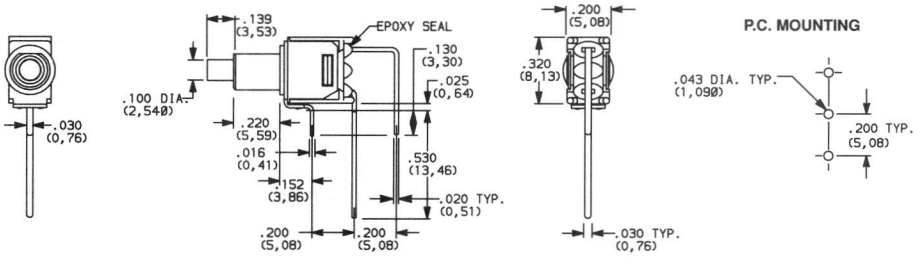
B contact material std.

Part No. Shown: TP21SH9ABE

AV

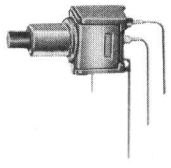


SPST
TP11 MODEL ONLY

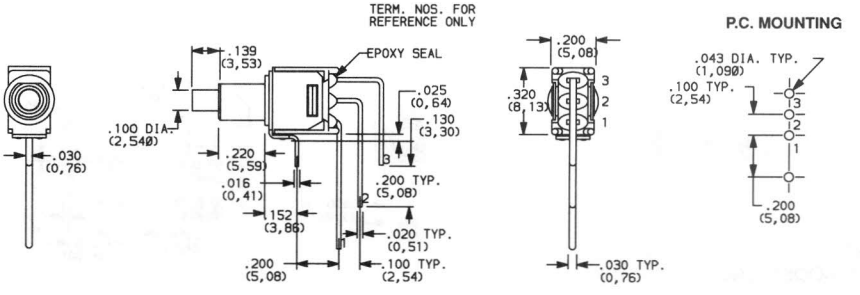


Term. bend radii and lead-in mfg. option.
B contact material std.

Part No. Shown: TP11SH9AVBE



SPDT
TP12 MODEL ONLY

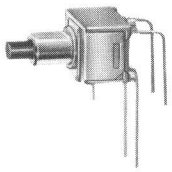


Term. bend radii and lead-in mfg. option.
B contact material std.

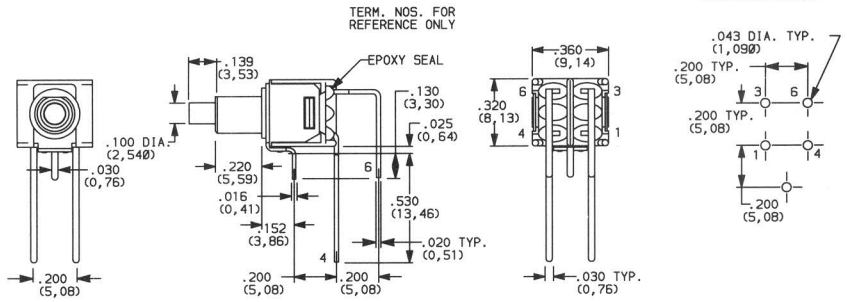
Part No. Shown: TP12SH9AVBE

TERMINATIONS

AV



DPST



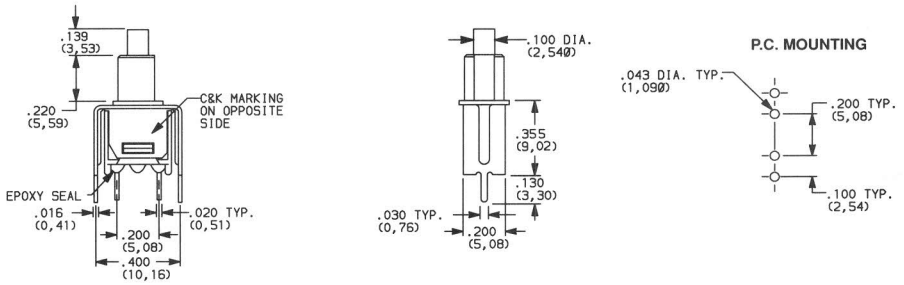
Term. bend radii and lead-in mfg. option.
B contact material std.

Part No. Shown: TP21SH9AVBE

V3



SPST
TP11 MODEL ONLY

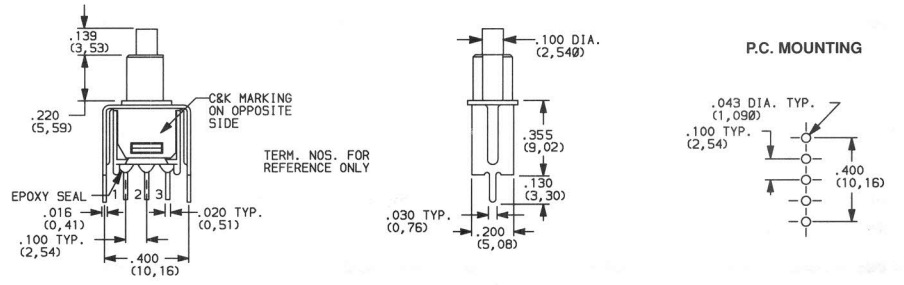


Part No. Shown: TP11SH9V3BE

B contact material std.



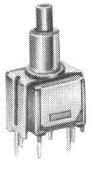
SPDT
TP12 MODEL ONLY



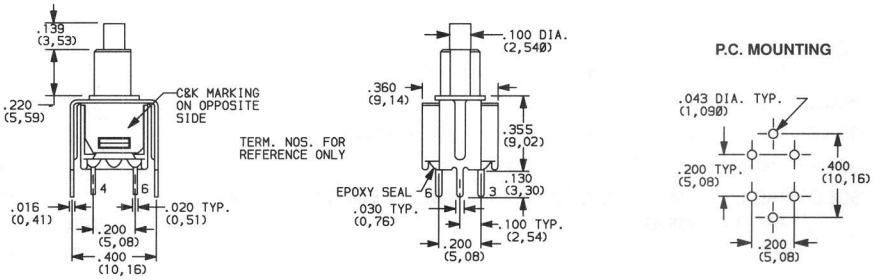
B contact material std.

Part No. Shown: TP12SH9V3BE

V3



DPST



B contact material std.

Part No. Shown: TP21SH9V3BE

D

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	1 AMP @120 V AC OR 28 V DC.
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @20 V AC OR DC MAX. OR 1 AMP @120 V AC OR 28 V DC.
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

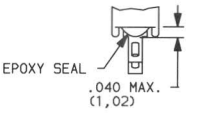
B contact material std. with A, AV, V3, W terminations.
Q contact material std. with Z, C terminations.

All models UL with all options when ordered with G, L, M or Q contact material.
See pages D-11 and VIII.

D

SEAL

E (STD.)



HOW TO ORDER

All available TP SERIES TINY PUSHBUTTON SWITCH options are listed on page D-10, and are described on pages D-11 thru D-16. Switches with standard options are shown on page D-11. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. UL models available, see page D-11. Actuator caps, hardware and accessories are available separately, see catalog section H.

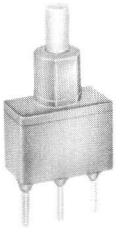
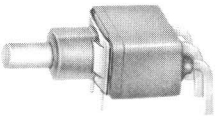
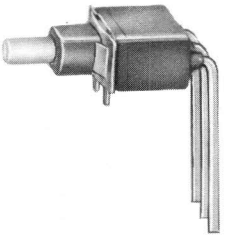
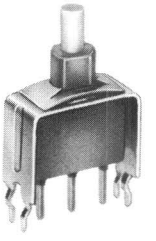
SPECIFICATIONS

CONTACT RATING: 1 AMP @ 120 V AC or 28 V DC (Q contact material).
ELECTRICAL LIFE: TP11, TP21 MODELS: 60,000 make-and-break cycles at full load.
TP12 MODELS: 30,000 cycles.
CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30°C to 85°C.
SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

MATERIALS

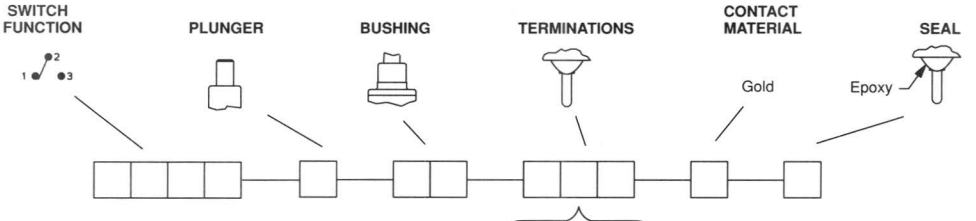
CASE: Glass filled nylon 6/6, flame retardant, heat stabilized or diallyl phthalate (DAP), (UL 94V-0).
PLUNGER: Thermoplastic polyester (UL 94V-0).
CAP & FRAME: Nylon, black std.
BUSHING: Brass, nickel plated.
HOUSING: Stainless steel.
SWITCH SUPPORT: Brass, tin plated.
END CONTACTS: Coin silver, silver plated (Q contact mat'l).
CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l).
TERMINAL SEAL: Epoxy.
HARDWARE: Nut & Locking ring – Brass nickel plated.
Lockwasher – Steel, nickel plated.

models available, see page D-18.

Easy Build-A-Switch:

Below is a complete listing of available options for E010 SERIES SEALED MOMENTARY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page D-18; all available options are shown and described on pages D-18 thru D-22. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-22. Actuator caps, hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.

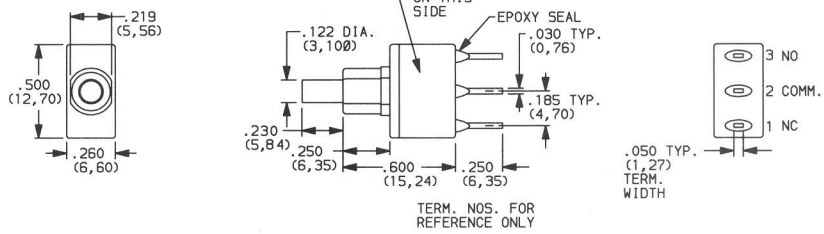


SWITCH FUNCTION	PLUNGER	BUSHING	TERMINATIONS		CONTACT MATERIAL	SEAL
E112	L	D1	A	W	B	E
	M	Y	A3	W1	G	
	S		AV1	W3	K	
			AV2	W4	L	
			AV3	W5	M	
			AV4	Z	Q	
			AV5	Z3		
			AW			
			AW1			
			AW3			
			AW4			
			AW5			
			C			
			R			
			R2			
			V2			
			V3			
			V4			
			V6			
			V7			
			V8			
			V9			
			V21			
			V31			
			V41			
			V61			
			V71			
			V81			
			V91			

D

SWITCH WITH STANDARD OPTIONS





SPDT

Part No. Shown: E112SD1CQE

SWITCH FUNCTION

NO. POLES	MODEL+ NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	SCHEMATIC
SP	E112	ON	MOM.	2-1	2-3	SPDT NC 1 ● 2 (COMM) ● 3 NO

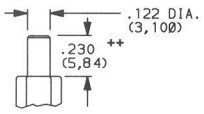
MOM. = MOMENTARY

+ All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

D

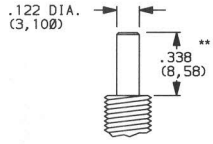
PLUNGER

S (STD.)



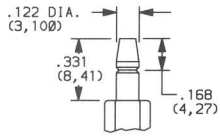
Std. with D1 bushing (as shown).
++ Subtract .100 (2,54) from plunger length when ordered with Y bushing.

L



Std. with Y bushing (as shown).
** Add .100 (2,54) to plunger length when ordered with D1 bushing.

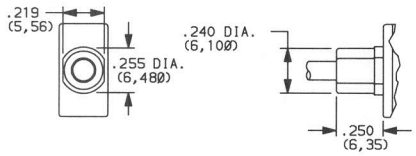
M



Caps available for all actuator options, see catalog section H.

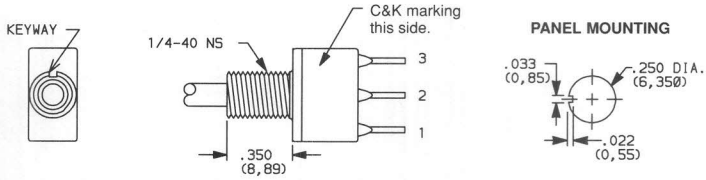
BUSHING

D1 (STD.)



S plunger std. with D1 bushing.

Y



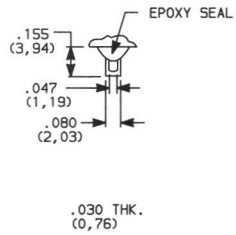
L plunger std. with Y bushing.
Available only with Z, C, Z3, W-W5 terminations.
Hardware: One dress nut P/N 780701201, one hex nut and lockwasher supplied std.

Internal o-ring actuator seal std. for all bushing options.

TERMINATIONS

Z

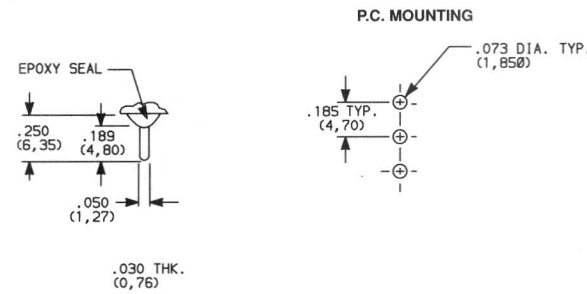
NEW



SPDT

Q contact material std.
Not avail. with K, L, or M contact material.

C (STD.)

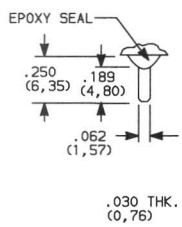


SPDT

Q contact material std.

Z3 QUICK CONNECT

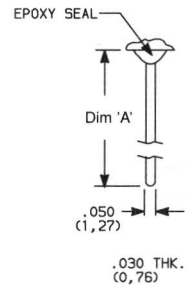
NEW



SPDT

Q contact material std.
Mating quick connect available; order P/N 530100000.

W-W1-W3-W4-W5 WIRE WRAP



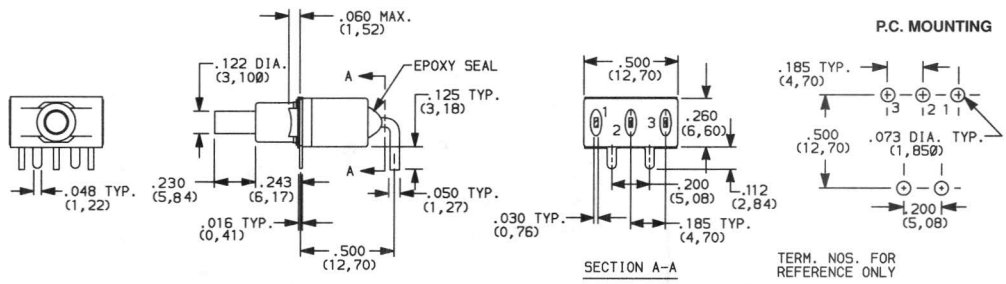
Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

SPDT

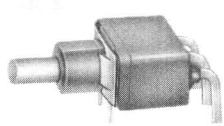
B contact material std.

D

A



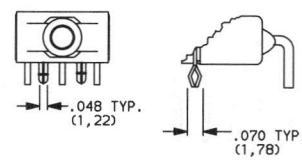
Part No. Shown: E112SD1ABE



A

SPDT

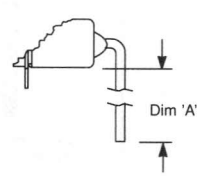
A3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4-AW5 EXTENDED

NEW

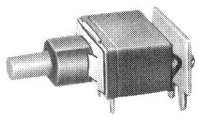


Option	Dim 'A'
AW	.50 (12,7)
AW1	.72 (18,3)
AW3	.20 (5,1)
AW4	.83 (21,1)
AW5	1.08 (27,4)

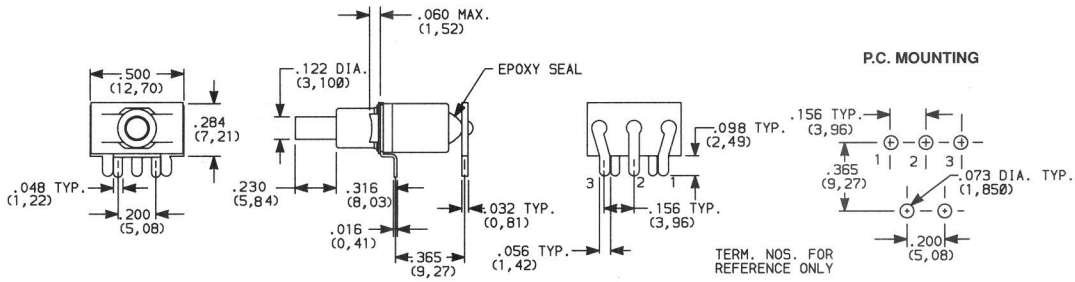
Term. bend radii and lead-in mfg. option.
B contact material std.
Available with D1 bushing only.

TERMINATIONS

R



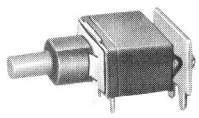
SPDT



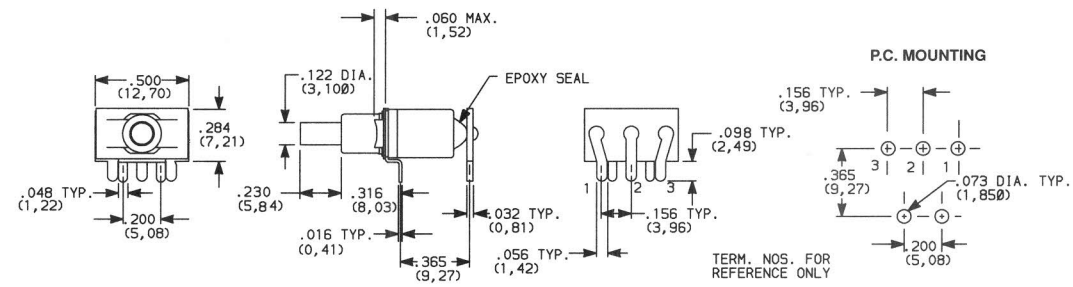
Available with D1 bushing and B contact mat'l only.

Part No. Shown: E112SD1RBE

R2

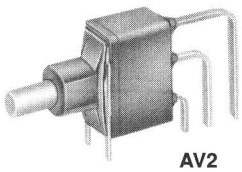


SPDT



Available with D1 bushing and B contact mat'l only.

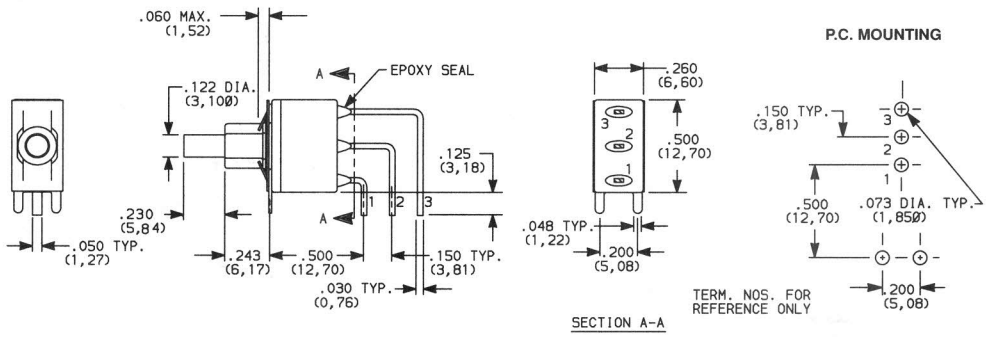
Part No. Shown: E112SD1R2BE



AV2

SPDT

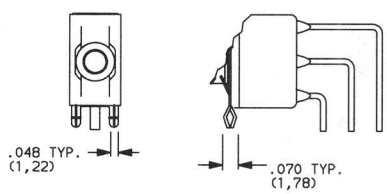
AV2



Part No. Shown: E112SD1AV2BE

AV3 SNAP-IN

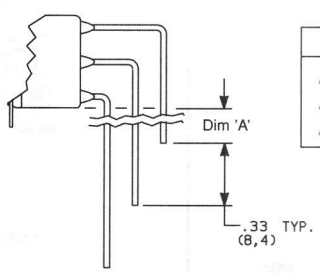
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED

NEW

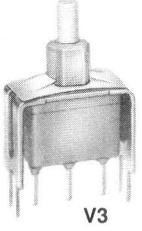


Option	Dim 'A'
AV1	.15 (3,8)
AV4	.25 (6,4)
AV5	.49 (12,4)

Term. bend radii and lead-in mfg. option.
B contact material std.
Available with D1 bushing only.

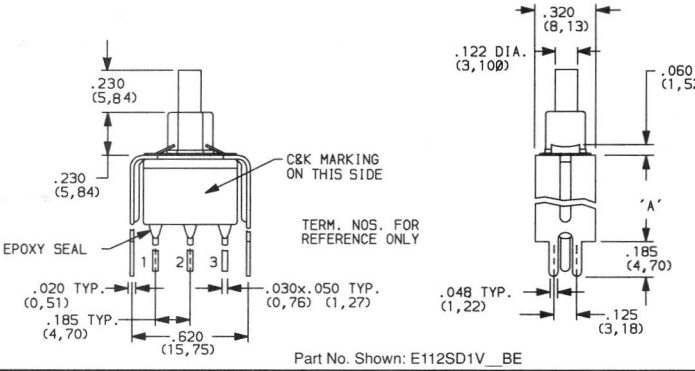
TERMINATIONS

V3-V4-V9 REPLACES V30-V40-V90



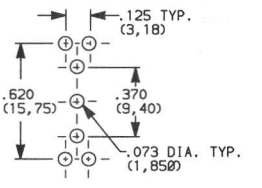
SPDT

V3



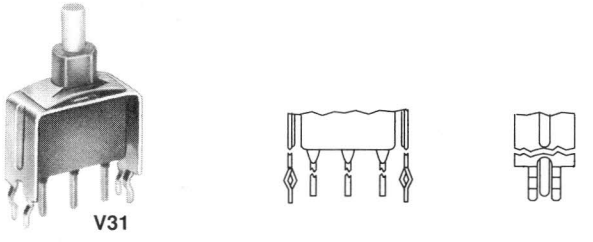
Part No. Shown: E112SD1V__BE

P.C. MOUNTING



Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V31-V41-V91 SNAP-IN

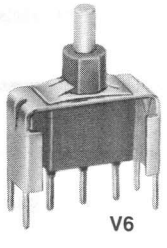


V31

SNAP-IN DESIGN RETAINS SWITCH.

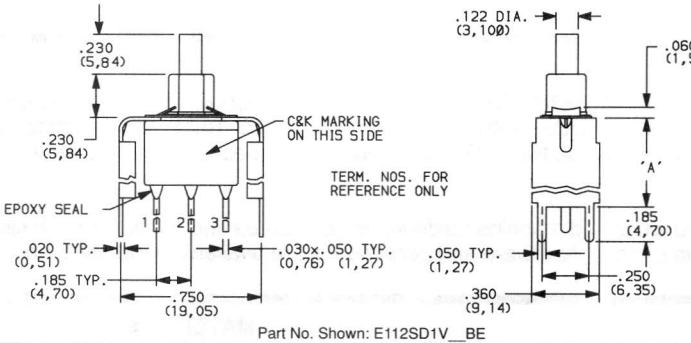
B contact material std.
Available with D1 bushing only.

V2-V6-V7-V8 REPLACES V20-V60-V70-V80



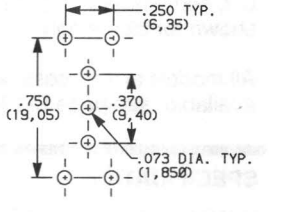
SPDT

V6



Part No. Shown: E112SD1V__BE

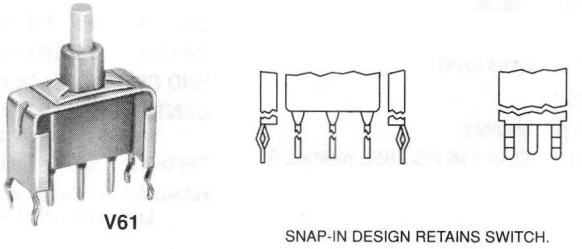
P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V21-V61-V71-V81 SNAP-IN

NEW



V61

SNAP-IN DESIGN RETAINS SWITCH.

B contact material std.
Available with D1 bushing only.

D

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	4 AMPS @125 V AC OR 28 V DC.
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @20 V AC OR DC MAX. OR 4 AMPS @125 V AC OR 28 V DC.
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

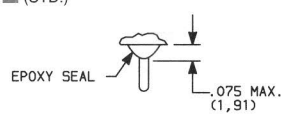
B contact material std. with all terminations except Z, C, Z3.
B contact material must be ordered with R, R2 terminations.
Q contact materials std. with Z, C, Z3 terminations.
K, L, M contact materials not available with Z terminations.

All models with all options when ordered with G, L, M or Q contact material.
See pages D-18 and VIII.

D

SEAL

E (STD.)



HOW TO ORDER

All available E010 SERIES SEALED MOMENTARY PUSHBUTTON SWITCH options are listed on page D-17, and are described on pages D-18 thru D-22. Switch with standard options is shown on page D-18. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. models available, see page D-18. Actuator caps, hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING: 4 AMPS @ 125 V AC or 28 V DC (Q contact mat'l).
ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.
CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30°C to 75°C.
CAP INSTALLATION FORCE: 10 lbs. max. permissible.
SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

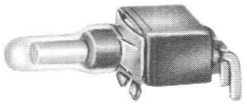
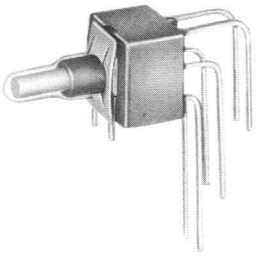
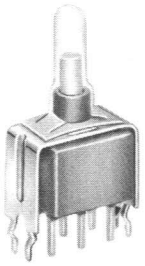
MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).
PLUNGER: Glass filled nylon or glass filled polyester (UL 94V-0), with internal o-ring seal std.
SWITCH SUPPORT: Brass or steel, tin plated.
SWITCH SUPPORT RETAINER: Stainless steel.
END CONTACTS: Coin silver, silver plated (Q contact mat'l).
CENTER CONTACTS & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l).
TERMINAL SEAL: Epoxy.
HARDWARE: Nut & locking ring – Brass, nickel plated. Lockwasher – Steel, nickel plated..

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

Sealed* Snap-Acting Momentary Pushbutton Switches

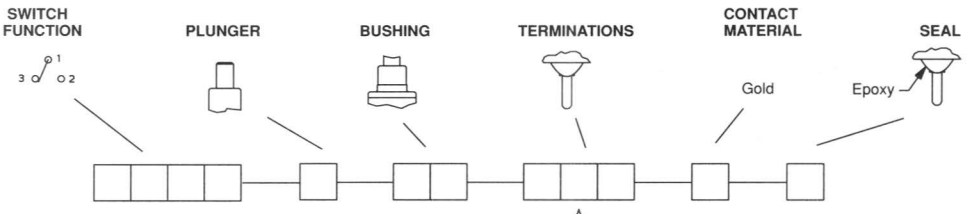
* Process sealed – withstands soldering and cleaning processes.

models available, see page D-24.

Easy Build-A-Switch:

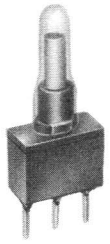
Below is a complete listing of available options for E020 SERIES SEALED SNAP-ACTING MOMENTARY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page D-24; all available options are shown and described on pages D-24 thru D-30. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-30. Actuator caps, hardware and accessories are available separately, see catalog section H. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods.



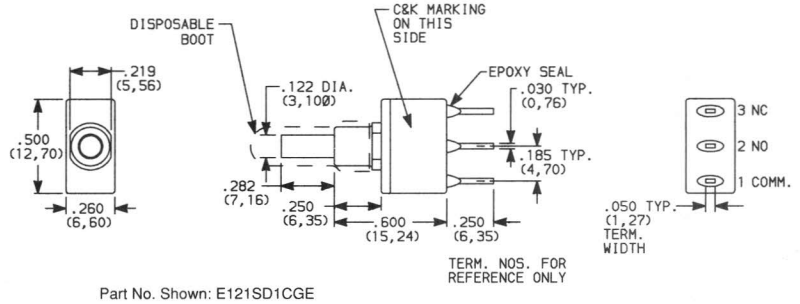
SWITCH FUNCTION	PLUNGER	BUSHING	TERMINATIONS		CONTACT MATERIAL	SEAL
E121	M	D1	A	W	B	E
E125	S	D3	A3	W1	G	
E221	S1		AV1	W3	K	
E225			AV2	W4	L	
			AV3			
			AV4			
			AW			
			AW1			
			AW3			
			AW4			
			C			
			R			
			R2			
			V2			
			V3			
			V4			
			V6			
			V7			
			V8			
			V9			
			V21			
			V31			
			V41			
			V61			
			V71			
			V81			
			V91			

D

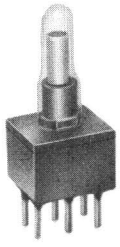
SWITCHES WITH STANDARD OPTIONS



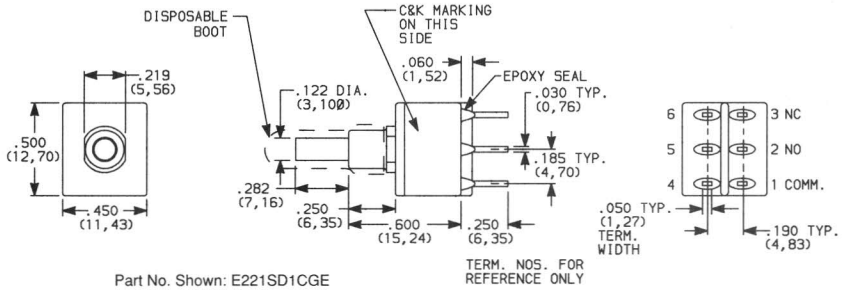
SPDT



Part No. Shown: E121SD1CGE



DPDT



Part No. Shown: E221SD1CGE

D

SWITCH FUNCTION

NO. POLES	MODEL+ NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	SCHEMATIC
SP	E121	ON	MOM.	1-3	1-2	SPDT: 1 (COMM), NC 3, 2 NO
	E125	ON	MOM.			
DP	E221	ON	MOM.	1-3,4-6	1-2,4-5	DPDT: 1 (COMM) 4, NC 3, 2 NO, NC 6, 5 NO
	E225	ON	MOM.			

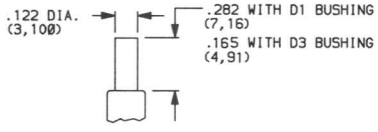
MOM. = MOMENTARY

+ E121, E221 models with all options when ordered with G or L contact material. See AGENCY APPROVALS, page VIII.

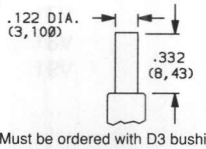
EX25 models must be ordered with B or K contact material.
EX21 models must be ordered with G or L contact material.

PLUNGER

S (STD.)

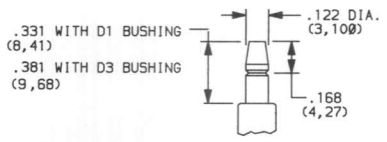


S1 NEW



Must be ordered with D3 bushing.

M SNAP-FITTING



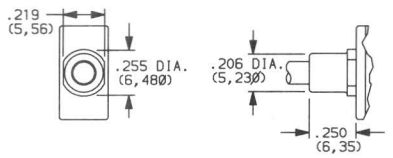
Caps available for all plunger options, see catalog section H.

Sealed* Snap-Acting Momentary Pushbutton Switches

* Process sealed – withstands soldering and cleaning processes.

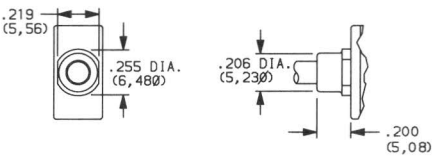
BUSHING

D1 (STD.)



Not available with S1 actuator.

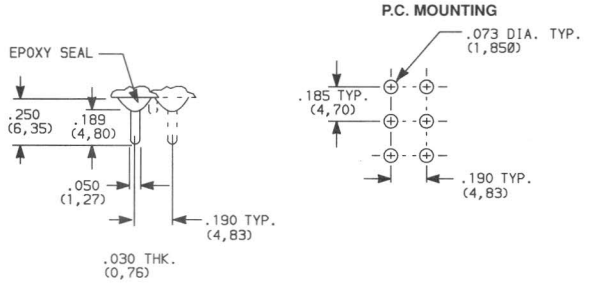
D3



Disposable splashproof vinyl boot over actuator and bushing supplied std., see page D-30.

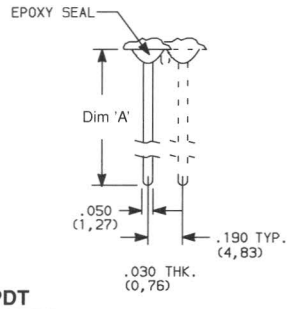
TERMINATIONS

C (STD.)



SPDT and DPDT

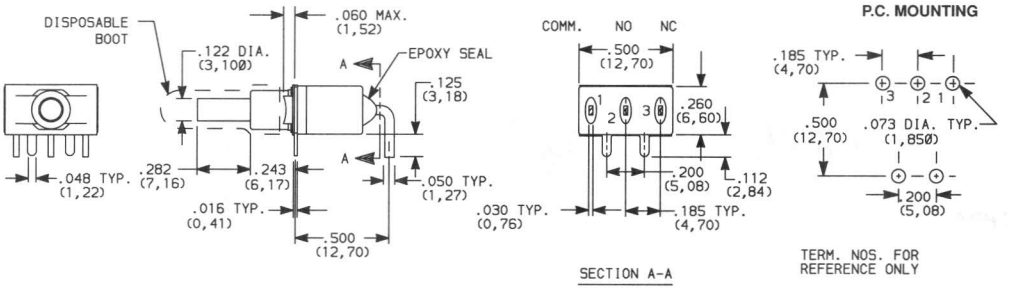
W-W1-W3-W4 WIRE WRAP



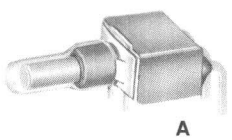
Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)

SPDT and DPDT

A



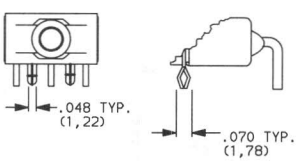
Part No. Shown: E121SD1AGE



A

SPDT

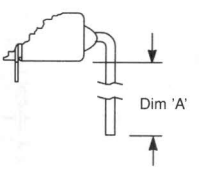
A3 SNAP-IN



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4 EXTENDED

NEW

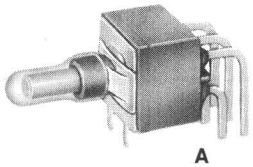


Option	Dim 'A'
AW	.50 (12,7)
AW1	.72 (18,3)
AW3	.20 (5,1)
AW4	.83 (21,1)

Term. bend radii and lead-in mfg. option.

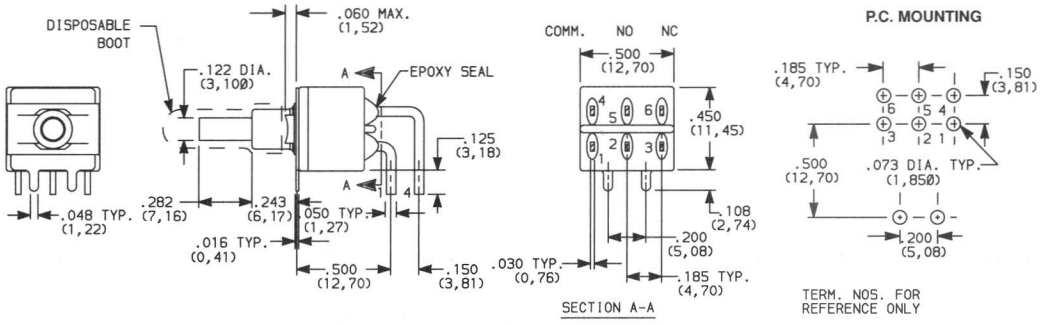
TERMINATIONS

A



A

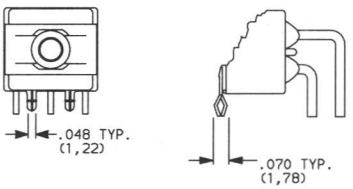
DPDT



Part No. Shown: E221SD1AGE

A3 SNAP-IN

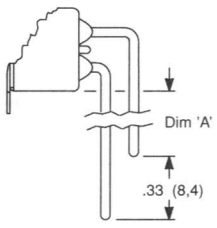
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW4 EXTENDED

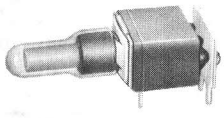
NEW



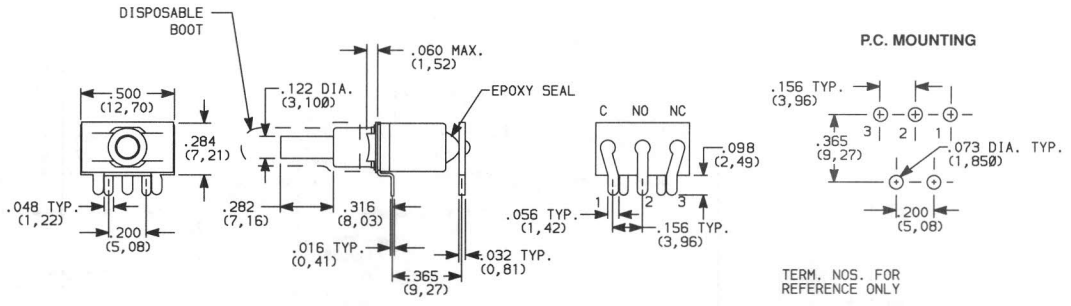
Option	Dim 'A'
AW	.21 (5,3)
AW1	.42 (10,7)
AW4	.52 (13,2)

Term. bend radii and lead-in mfg. option.

R

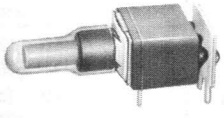


SPDT

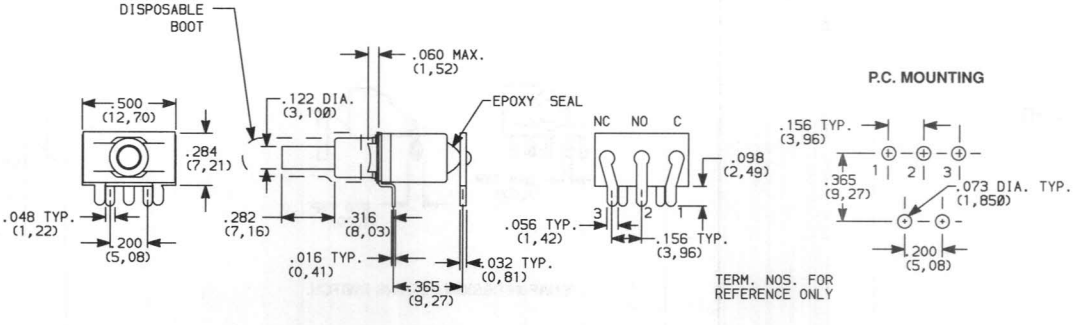


Part No. Shown: E121SD1RGE

R2



SPDT

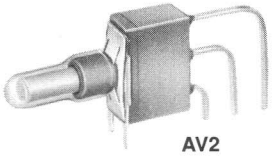


Part No. Shown: E121SD1R2GE

Sealed* Snap-Acting Momentary Pushbutton Switches

* Process sealed – withstands soldering and cleaning processes.

TERMINATIONS

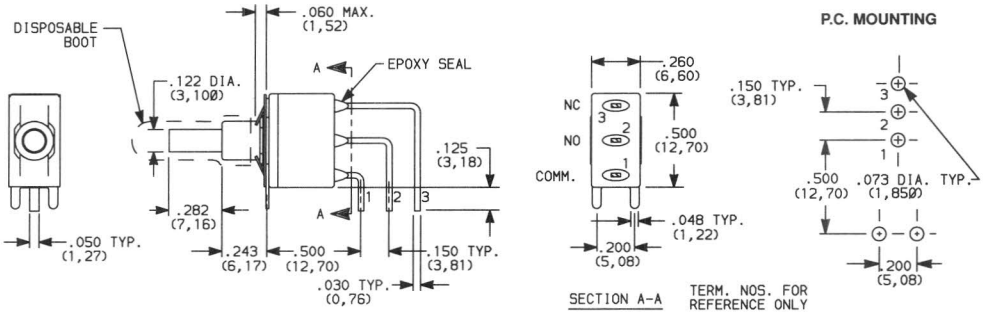


AV2

SPDT

Term. bend radii and lead-in mfg. option.

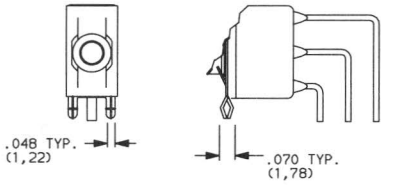
AV2



Part No. Shown: E121SD1AV2GE

AV3 SNAP-IN

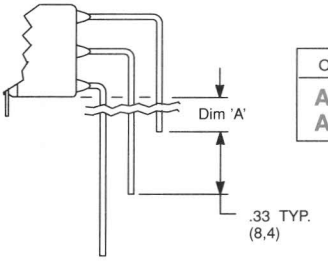
NEW



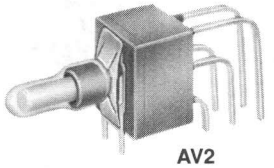
SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4 EXTENDED

NEW



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.25 (6,4)

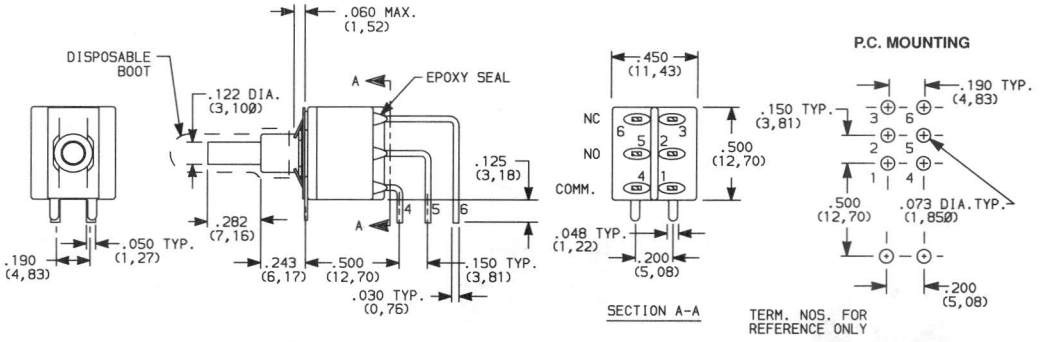


AV2

DPDT

Term. bend radii and lead-in mfg. option.

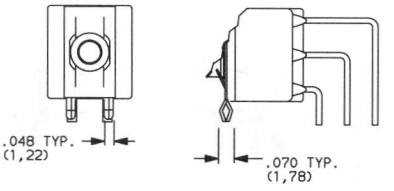
AV2



Part No. Shown: E221SD1AV2GE

AV3 SNAP-IN

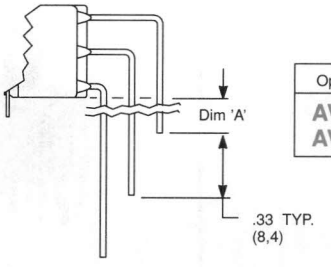
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4 EXTENDED

NEW

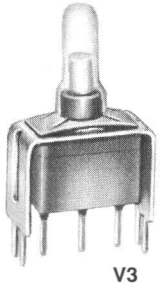


Option	Dim 'A'
AV1	.15 (3,8)
AV4	.25 (6,4)

D

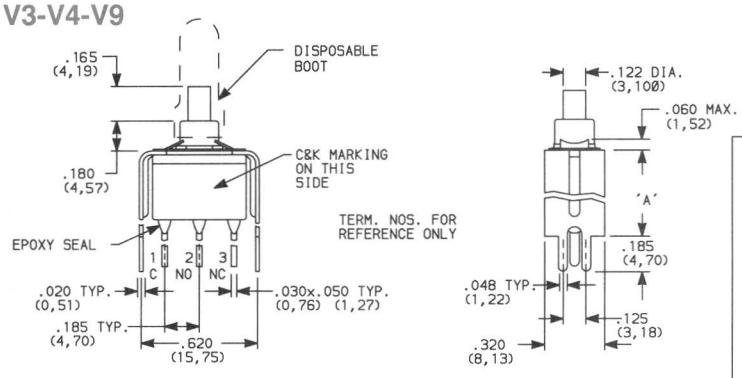
TERMINATIONS

SPDT



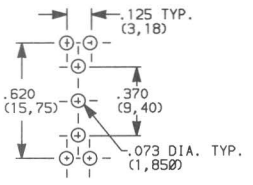
V3

V3-V4-V9



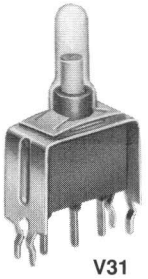
Part No. Shown: E121SD3V__GE

P.C. MOUNTING

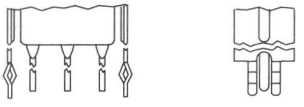


Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V31-V41-V91 SNAP-IN



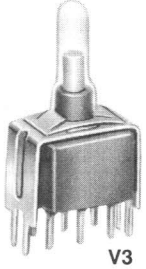
V31



SNAP-IN DESIGN RETAINS SWITCH.

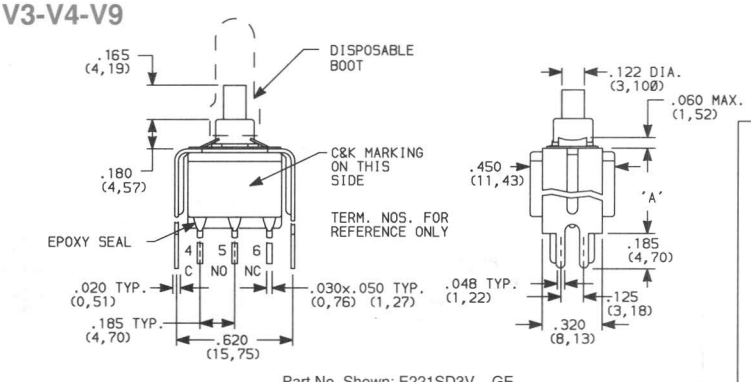
NEW

DPDT



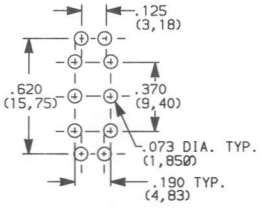
V3

V3-V4-V9



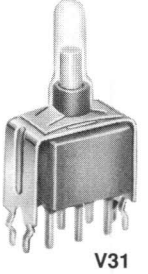
Part No. Shown: E221SD3V__GE

P.C. MOUNTING

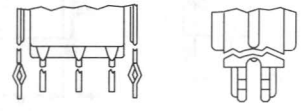


Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V31-V41-V91 SNAP-IN



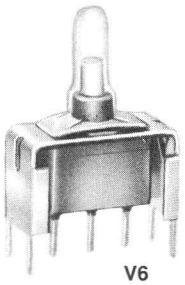
V31



SNAP-IN DESIGN RETAINS SWITCH.

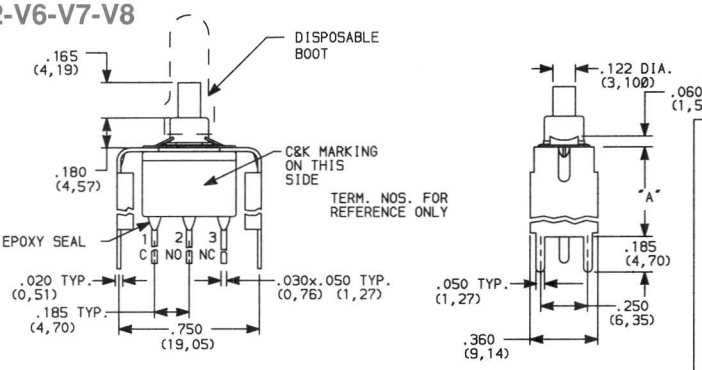
TERMINATIONS

SPDT



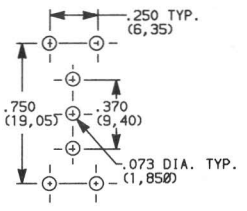
V6

V2-V6-V7-V8



Part No. Shown: E121SD3V__GE

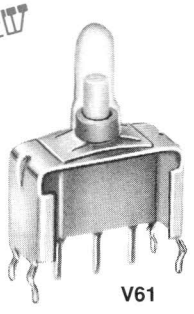
P.C. MOUNTING



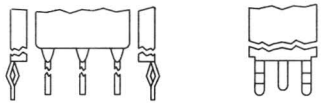
Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V21-V61-V71-V81 SNAP-IN

NEW



V61

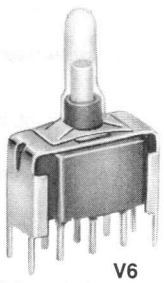


SNAP-IN DESIGN RETAINS SWITCH.

D

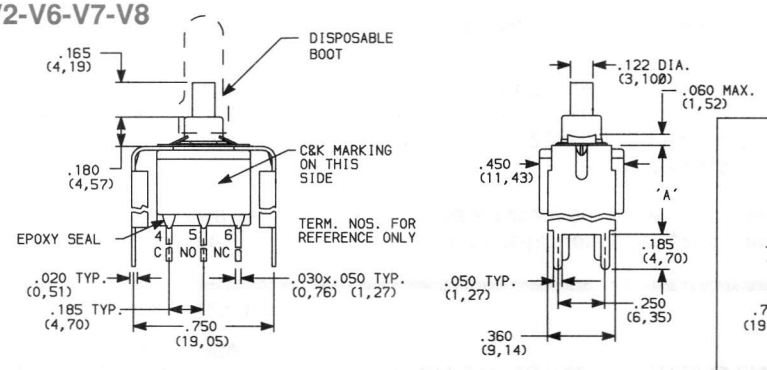
NEW

DPDT



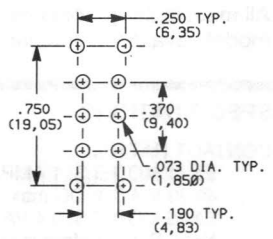
V6

V2-V6-V7-V8



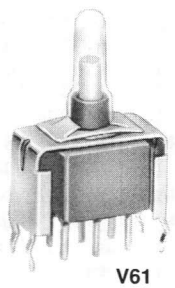
Part No. Shown: E221SD3V__GE

P.C. MOUNTING

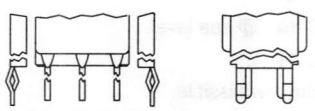


Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V21-V61-V71-V81 SNAP-IN



V61



SNAP-IN DESIGN RETAINS SWITCH.

Sealed* Snap-Acting Momentary Pushbutton Switches

* Process sealed – withstands soldering and cleaning processes.

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	EX25 MODELS ONLY: 0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [4]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	EX21 MODELS ONLY: 0.4 VA MAX @20 V AC OR DC MAX. OR 1 AMP @120 V AC OR 28 V DC.
L		TIN-LEAD [4]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] ALL CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] N.O. AND N.C. CONTACTS: Coin silver, with gold plate over nickel plate.
[3] COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

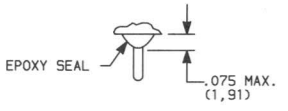
B or K contact material must be ordered with EX25 models.
G or L contact material must be ordered with EX21 models.

E121, E221 model nos. with all options when ordered with mandatory G or L contact material. See pages D-24 and VIII.

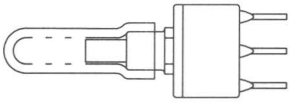
D

SEAL

E (STD.)



Disposable splashproof boot supplied std. Remove and discard boot **only after** soldering and cleaning processes are complete.



HOW TO ORDER

All available E020 SERIES SEALED SNAP-ACTING MOMENTARY PUSHBUTTON SWITCH options are listed on page D-23, and are described on pages D-24 thru D-30. Switches with standard options are shown on page D-24. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. models available, see page D-24. Actuator caps, hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
EX21 MODELS: 1 AMP @ 120 V AC or 28 V DC, or 0.4 VA max. @ 20 V AC or DC max. (G contact mat'l).
EX25 MODELS: 0.4 VA max. @ 20 V AC or DC max. (B contact mat'l).
Note: Break-before-make contacts. Multi-pole contacts do not make and break simultaneously.

ELECTRICAL LIFE: 60,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 75°C.

CAP INSTALLATION FORCE: 10 lbs. max. permissible.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

MATERIALS

CASE & BUSHING: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

PLUNGER: Glass filled nylon or glass filled polyester (UL 94V-0).

SWITCH SUPPORT: Brass or steel, tin plated.

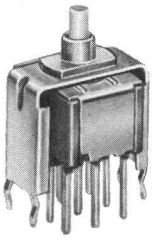
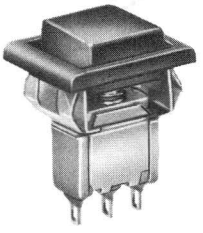
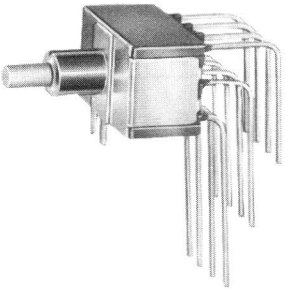
SWITCH SUPPORT RETAINER: Stainless steel.

N.O. & N.C. CONTACTS:
EX21 MODELS: Coin silver, with gold plate over nickel plate (G contact mat'l).
EX25 MODELS: Copper alloy, with gold plate over nickel plate (B contact mat'l).

COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

TERMINAL SEAL: Epoxy.

DISPOSABLE BOOT: Vinyl splashproof boot supplied std. Remove and discard **only after** soldering and cleaning processes are complete.

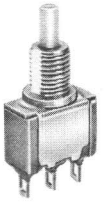
models available, see page C-33.

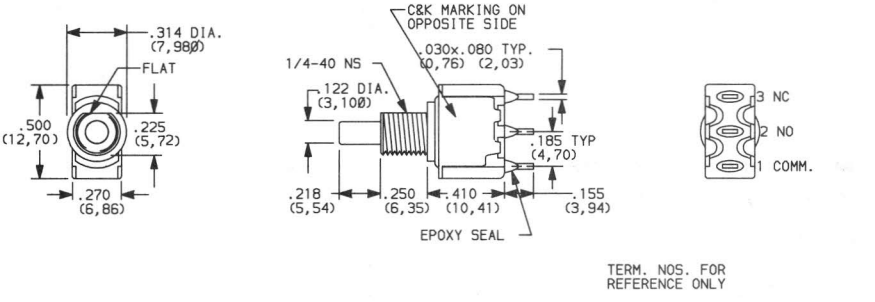
Easy Build-A-Switch:

Below is a complete listing of available options for 8020 SERIES SNAP-ACTING MOMENTARY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page D-32; all available options are shown and described on pages D-33 thru D-46. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-46. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

SWITCH FUNCTION	ACTUATOR OR PLUNGER	BUSHING	TERMINATIONS	CONTACT MATERIAL		SEAL	CAP COLOR	FRAME COLOR	LED COLOR
				Gold		Epoxy	Black	Black	Red
8121	J80	(NONE)	A	W	B	E	(NONE)	(NONE)	(NONE)
8125	J81	D	A2	W1	G	I	1	1	3
8221	J82	D2	A3	W3	K		2	2	5
8225	J83	D3	A4	W4	L		3	3	6
8321	J84	D8	A6	Z			4	4	
8325	J85	D9	AV1	Z3			5	5	
8421	J95	H	AV2				6	6	
8425	L	H9	AV3				7	7	
U811	M	Y	AV4				8	8	
U821	S	Y3	AW				9	9	
U831		Y4	AW1						
U841		Y9	AW3						
			AW4						
			C						
			R						
			R2						
			V2						
			V3						
			V4						
			V6						
			V7						
			V8						
			V9						
			V21						
			V31						
			V41						
			V61						
			V71						
			V81						
			V91						

SWITCHES WITH STANDARD OPTIONS

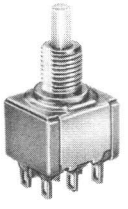


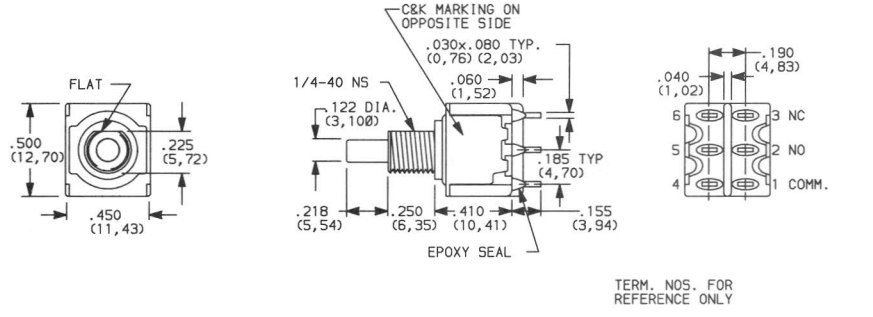


SPDT

Part No. Shown: 8121SHZGE

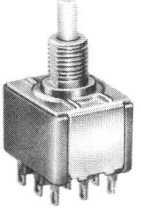
D

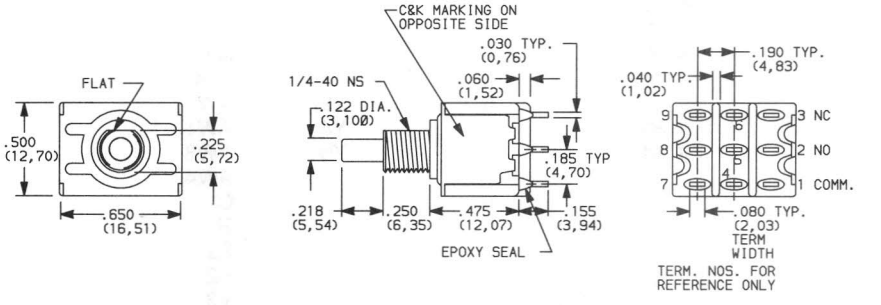




DPDT

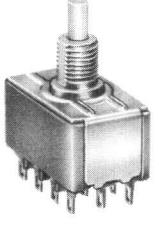
Part No. Shown: 8221SHZGE

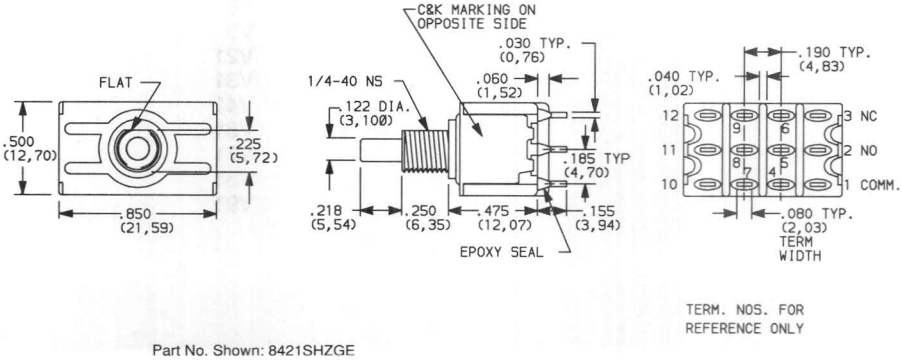




3PDT

Part No. Shown: 8321SHZGE





4PDT

Part No. Shown: 8421SHZGE

SWITCH FUNCTION

NO. POLES	MODEL NO.	UL/CSA* MODEL NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	SCHEMATIC
SP	8121	U811	ON	MOM.	1-3	1-2	SPDT
	8125		ON	MOM.			
DP	8221	U821	ON	MOM.	1-3,4-6	1-2,4-5	DPDT
	8225		ON	MOM.			
3P	8321	U831	ON	MOM.	1-3,4-6,7-9	1-2,4-5,7-8	3PDT
	8325		ON	MOM.			
4P	8421	U841	ON	MOM.	1-3,4-6,7-9,10-12	1-2,4-5,7-8,10-11	4PDT
	8425		ON	MOM.			

MOM. = MOMENTARY

* U811 thru U841 model nos. with all options when ordered with G or L contact material. See AGENCY APPROVALS, page VIII.

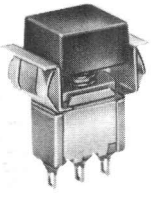
8X25 models must be ordered with B or K contact material. 8X21 and U8X1 models must be ordered with G or L contact material.

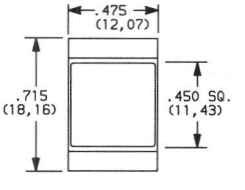
D

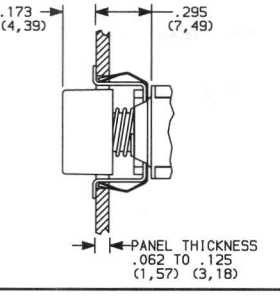
ACTUATORS – SNAP-IN FRONT MOUNT

ACTUATOR OR PLUNGER — CAP COLOR — FRAME COLOR

J80

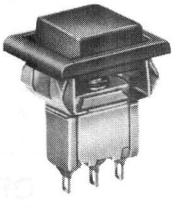


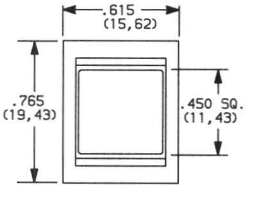


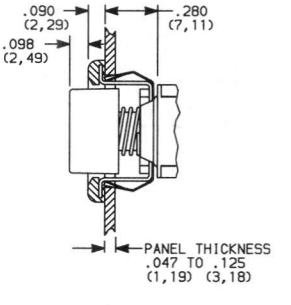


No frame color choice required.

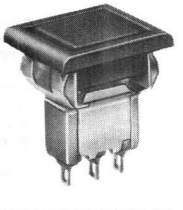
J81 WITH FRAME AND RAISED CAP

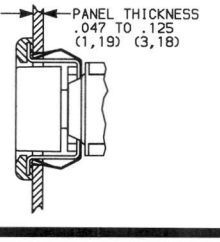






J83 WITH FRAME AND FLUSH CAP





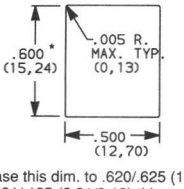
CAP AND FRAME COLORS

OPTION CODE	CAP AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select cap and frame colors (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Hardware is available separately, see catalog section H.

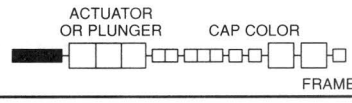
Available with Z, C, Z3, or W-W4 terminations and SPDT and DPDT models only.

PANEL MOUNTING J80 – J81 – J83

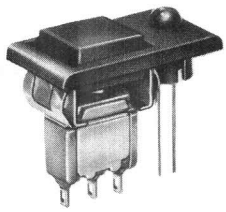


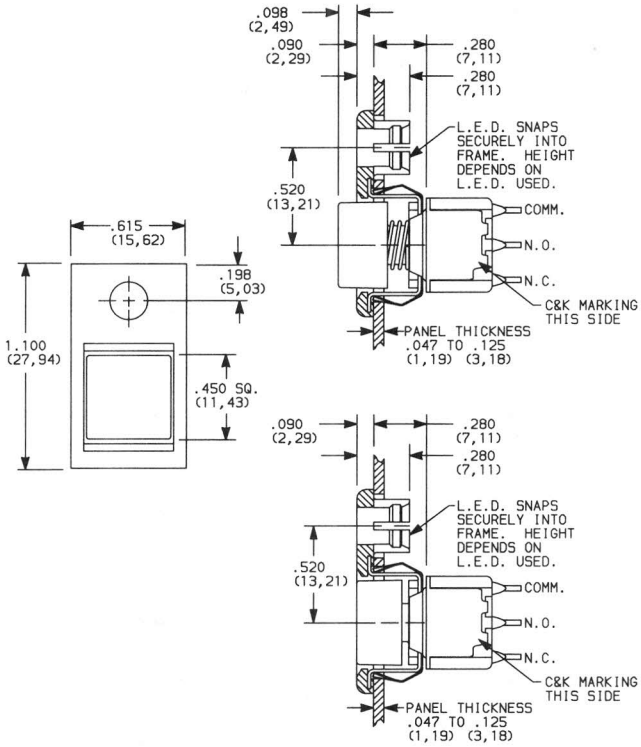
* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

ACTUATORS – SNAP-IN FRONT MOUNT

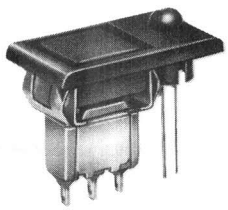


J82 WITH FRAME FOR LED AND RAISED CAP





J84 WITH FRAME FOR LED AND FLUSH CAP



U.S. Patent No. 4,004,120
LED not included.
See page IX for LED information.

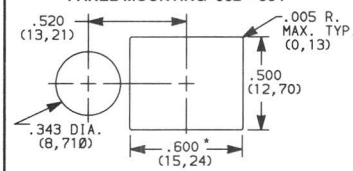
CAP AND FRAME COLORS

OPTION CODE	CAP AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select cap and frame colors from chart. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

Available with Z, C, Z3, or W-W4 terminations and SPDT and DPDT models only.

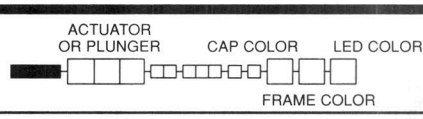
PANEL MOUNTING J82 – J84



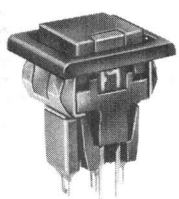
* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

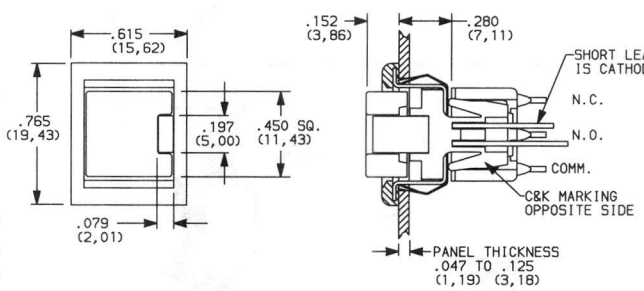
D

ACTUATORS – SNAP-IN FRONT MOUNT

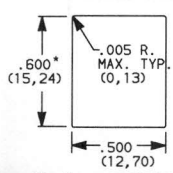


J85 WITH FRAME, RAISED CAP, AND BUILT- IN LED





PANEL MOUNTING



* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

See page IX for LED information.

CAP AND FRAME COLORS

OPTION CODE	CAP AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

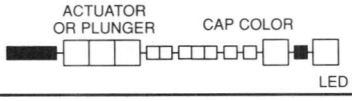
LED COLOR

OPTION CODE	LED COLORS
3	RED (std.)
5	YELLOW
6	GREEN

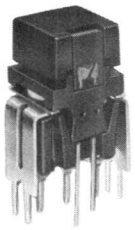
Select cap, frame and LED color from charts. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator legends and markings available, consult factory. Cap and frame available separately, see catalog section H.

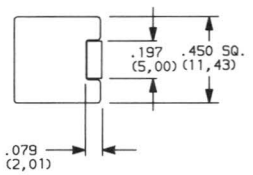
Available with Z, C, Z3 or W-W4 terminations and SPDT model only.

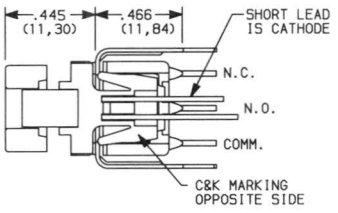
ACTUATORS – P.C. MOUNT



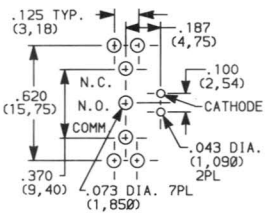
J95 WITH BUILT- IN LED







P.C. MOUNTING



CAP COLOR

OPTION CODE	CAP COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

LED COLOR

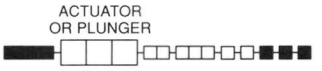
OPTION CODE	LED COLOR
3	RED (std.)
5	YELLOW
6	GREEN

Select cap and LED colors from charts. Place option codes in appropriate boxes of ordering format. Cap finish: matte. Custom actuator legends and markings available, consult factory. Cap available separately, see catalog section H.

Avail. with V3 termination and SPDT model only.

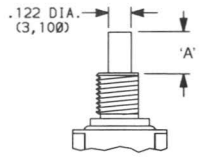
See page IX for LED information.

PLUNGER



When selecting plunger option, bushing selection must also be made, see next page.

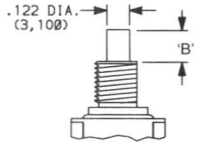
S (STD.)



AVAIL. BUSHINGS see next page	DIM 'A' FOR Z,C,Z3,W-W4 TERMINATIONS	DIM 'A' FOR A,A2,A3,A4,A6, AV1-AV4,AW-AW4,R,R2 TERMINATIONS	DIM 'A' FOR V2-V91 TERMINATIONS
D, D9	.244 (6,20)	.228 (5,79)	.224 (5,69)
H, H9	.218 (5,54)	.202 (5,13)	.198 (5,03)
Y, Y9	.203 (5,16)	.187 (4,75)	.183 (4,65)
Y3	(5,54)	(5,13)	(5,03)
Y4	.185 (4,70)	.169 (4,29)	.165 (4,19)
D2, D8	N/A	.232 (5,89)	.228 (5,79)
D3	.178 (4,52)	.162 (4,11)	.158 (4,01)

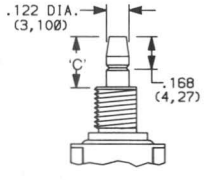
N/A = NOT AVAILABLE

L



AVAIL. BUSHINGS see next page	DIM 'B' FOR Z,C,Z3,W-W4 TERMINATIONS	DIM 'B' FOR A,A2,A3,A4,A6, AV1-AV4,AW-AW4,R,R2 TERMINATIONS	DIM 'B' FOR V2-V91 TERMINATIONS
Y, Y9	.178 (4,52)	.162 (4,11)	.158 (4,01)
Y4	.090 (2,29)	.074 (1,88)	.070 (1,78)

M SNAP-FITTING



AVAIL. BUSHINGS see next page	DIM 'C' FOR Z,C,Z3,W-W4 TERMINATIONS	DIM 'C' FOR A,A2,A3,A4,A6, AV1-AV4,AW-AW4,R,R2 TERMINATIONS	DIM 'C' FOR V2-V91 TERMINATIONS
D, D9	.297 (7,54)	.281 (7,14)	.277 (7,04)
H, H9	.267 (6,78)	.251 (6,38)	.247 (6,27)
Y, Y9	.259 (6,58)	.243 (6,17)	.239 (6,07)
Y3	(6,78)	(6,37)	(6,27)
Y4	.259 (6,58)	.243 (6,17)	.239 (6,07)
D2, D8	N/A	.273 (6,93)	.269 (6,83)
D3	.158 (4,01)	.142 (3,61)	.138 (3,51)

N/A = NOT AVAILABLE

Additional plunger lengths are available on SPDT and DPDT models, consult factory.

Not all plunger lengths sufficient for use with caps. See cap dims., catalog section H.

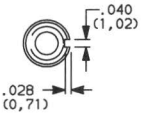
BUSHING

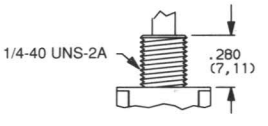
When selecting bushing option, plunger selection must also be made, see previous page. Plunger lengths vary with bushing and termination options selected. No bushing option choice required when any JXX actuator option is selected.

(NONE)

No bushing choice required when any JXX actuator option is selected.

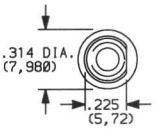
D
D9 UNTHREADED

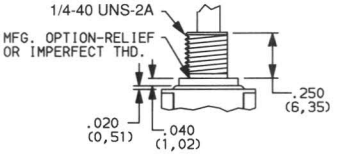




D9 bushing std. with A-A6, AW-AW4, R, R2 AV1-AV4 terminations.

H
H9 UNTHREADED

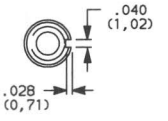


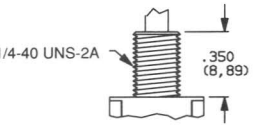


H bushing std. with Z, C, Z3 or W-W4 terminations. H, H9 bushings not available on single pole models with A-A6, AW-AW4, R, R2 terminations.

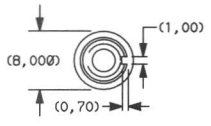
Will withstand 12 in.-lbs. of torque with no distortion.

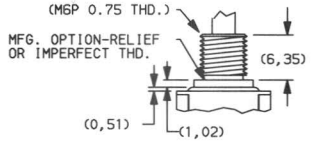
Y
Y9 UNTHREADED



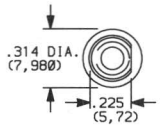


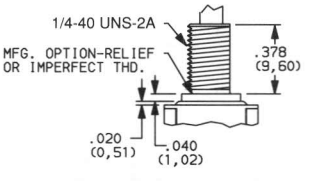
Y3 METRIC





Y4

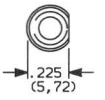


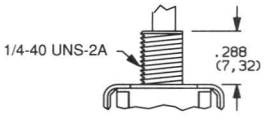


Y3, Y4 bushings not available on single pole models with A-A6, AW-AW4, R, R2 terminations.

Will withstand 12 in.-lbs. of torque with no distortion.

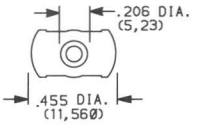
D2
D8 UNTHREADED

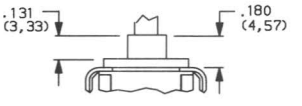




D2, D8 bushings not available with Z, C, Z3, W-W4 terminations.

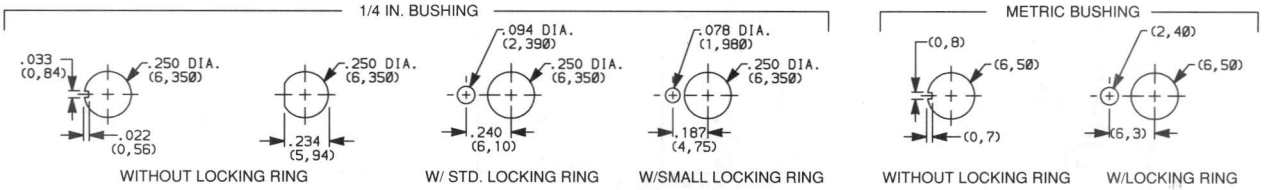
D3





D3 bushing std. with V2-V91 terminations.

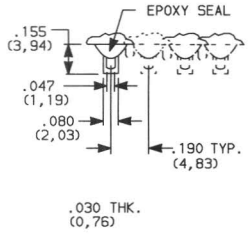
PANEL MOUNTING



HARDWARE: Two mounting nuts, locking ring and lockwasher supplied std. with threaded bushings. Optional mounting nut and locking ring styles and finishes available, see HARDWARE, catalog section H.

TERMINATIONS

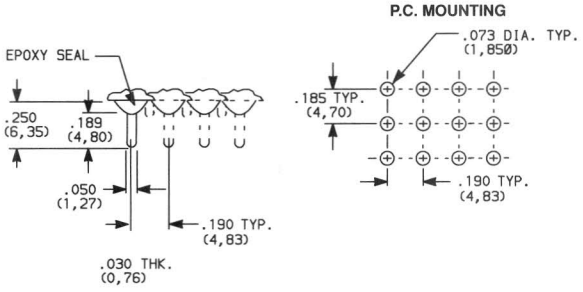
Z (STD.)



SPDT thru
4PDT

Not avail. with J95 actuator, K or L contact material options.

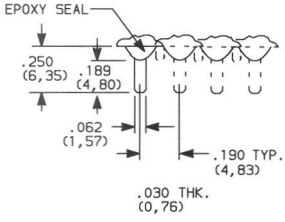
C



SPDT thru
4PDT

Not available with J95 actuator option.

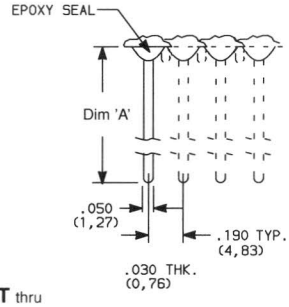
Z3 QUICK CONNECT



SPDT thru
4PDT

Not available with J95 actuator option.
Mating quick connector available; order part no. 530100000.

W-W1-W3-W4 WIRE WRAP



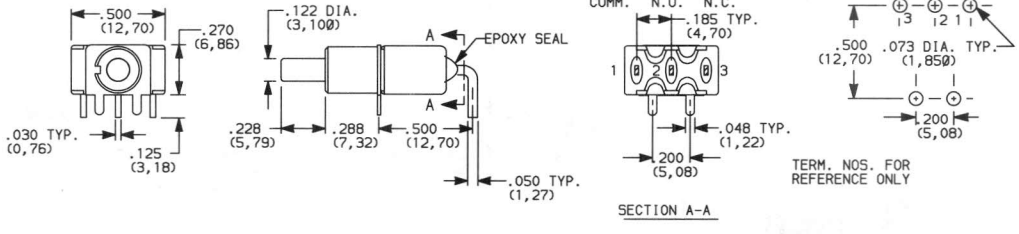
Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)

SPDT thru
4PDT

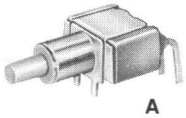
Not available with J95 actuator option.

D

A



Part No. Shown: 8121SD9AGE

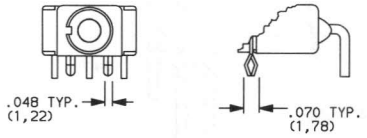


A

SPDT

A3 SNAP-IN

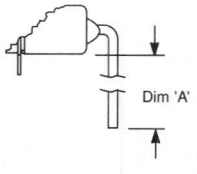
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW3-AW4 EXTENDED

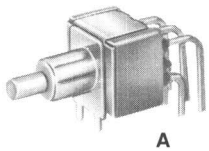
NEW



Option	Dim 'A'
AW	.50 (12,7)
AW1	.72 (18,3)
AW3	.20 (5,1)
AW4	.83 (21,1)

Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option.

TERMINATIONS

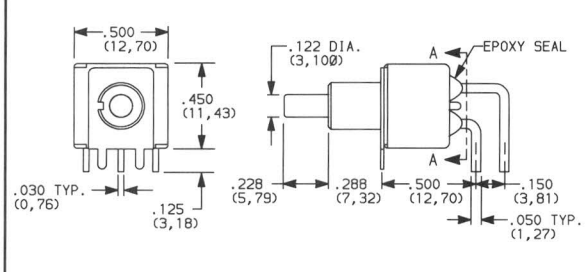


A

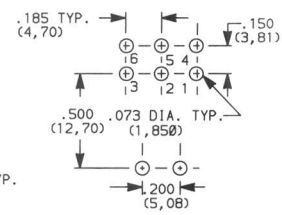
DPDT

Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, I seal option.

A



P.C. MOUNTING

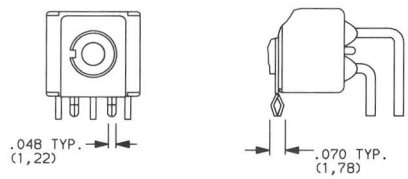


TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: 8221SD9AGE

A3 SNAP-IN

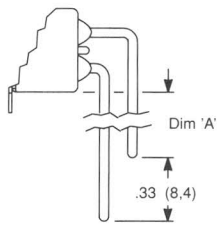
NEW



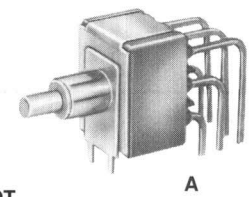
SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW4 EXTENDED

NEW



Option	Dim 'A'
AW	.19 (4,8)
AW1	.40 (10,2)
AW4	.50 (12,7)

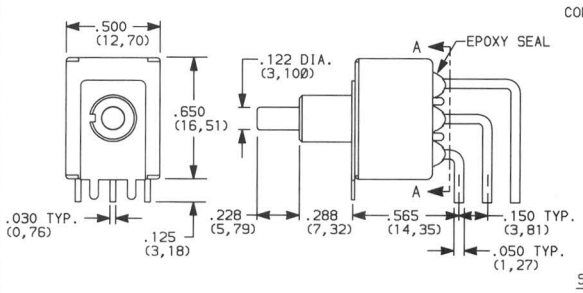


A

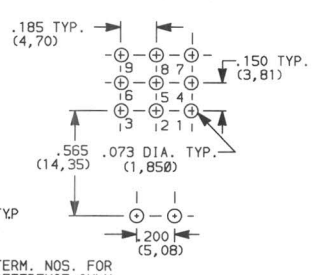
3PDT

Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, I seal option.

A



P.C. MOUNTING

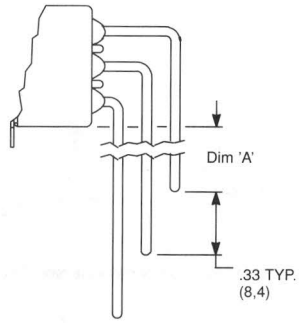


TERM. NOS. FOR REFERENCE ONLY

Part No. Shown: 8321SD9AGE

AW4 EXTENDED

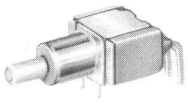
NEW

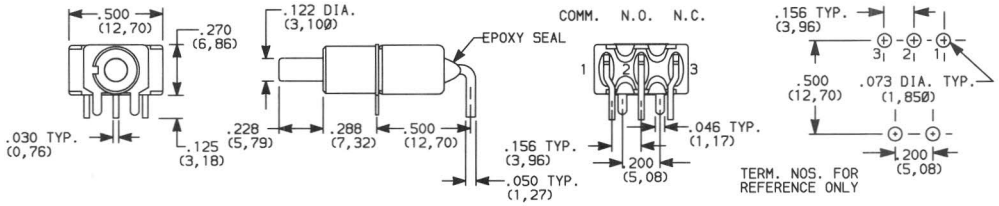


Option	Dim 'A'
AW4	.37 (9,4)

TERMINATIONS

A2



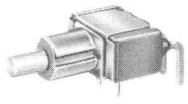


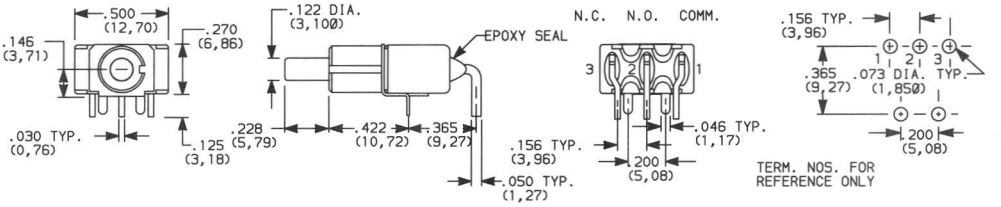
SPDT

Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option.

Part No. Shown: 8121SD9A2GE

A4





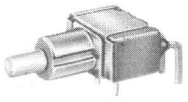
SPDT

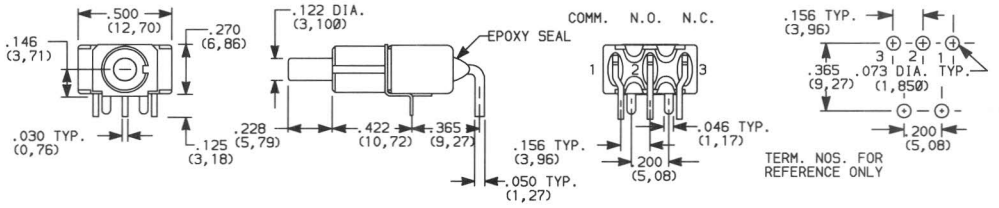
Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option.

The A4 and R2 termination options are functionally identical and fit the same P.C. mounting pattern. The switches, however, are shifted relative to the mounting holes. Unlike the R2, the A4 option is available with UL and CSA. Note that the P.C. pattern must clear the switch support legs.

Part No. Shown: 8121SD9A4GE

A6





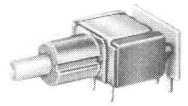
SPDT

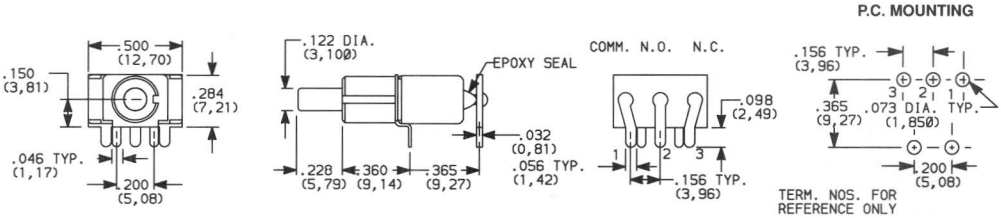
Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option.

The A6 and R termination options are functionally identical and fit the same P.C. mounting pattern. The switches, however, are shifted relative to the mounting holes. Unlike the R, the A6 option is available with UL and CSA. Note that the P.C. pattern must clear the switch support legs.

Part No. Shown: 8121SD9A6GE

R



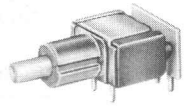


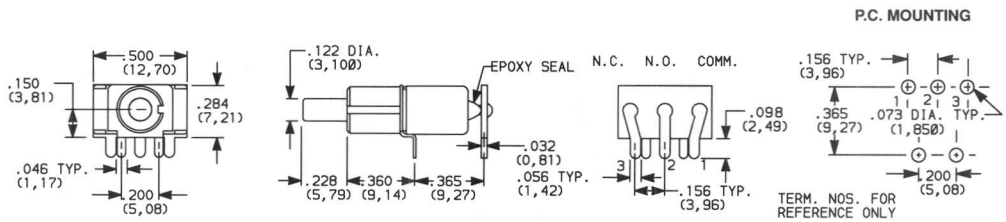
SPDT

Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option.

Part No. Shown: 8121SD9RGE

R2





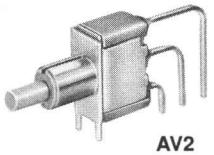
SPDT

Not available with JXX actuators, D3, H, H9, Y3, Y4 bushings, I seal option.

Part No. Shown: 8121SD9R2GE

D

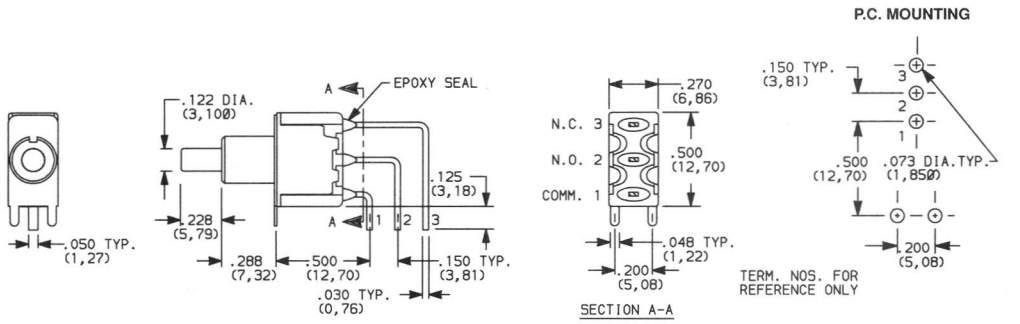
TERMINATIONS



AV2

SPDT

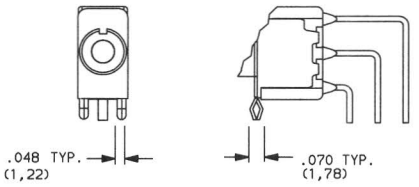
AV2



Part No. Shown: 8121SD9AV2GE

AV3 SNAP-IN

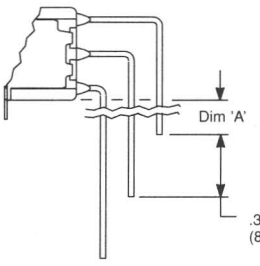
NEW



SNAP-IN DESIGN RETAINS SWITCH.

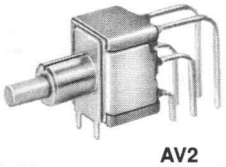
AV1-AV4 EXTENDED

NEW



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)

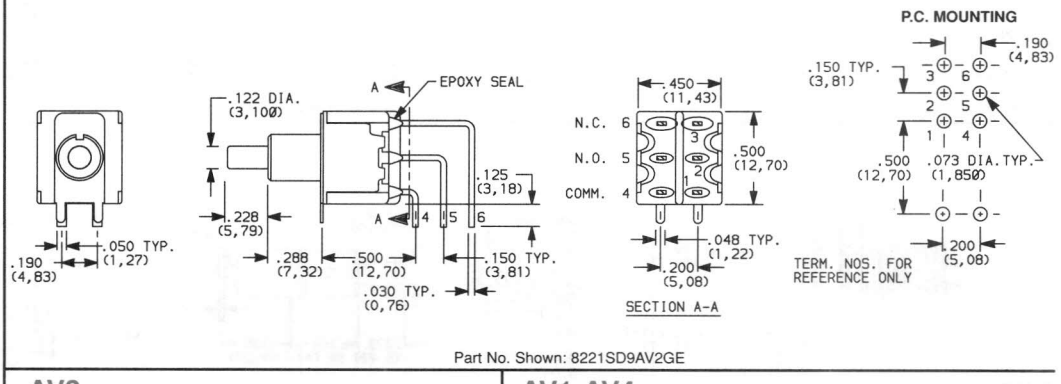
Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, I seal option.



AV2

DPDT

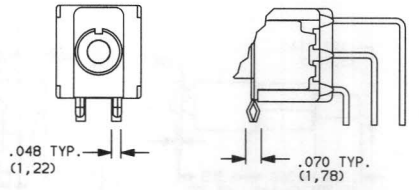
AV2



Part No. Shown: 8221SD9AV2GE

AV3 SNAP-IN

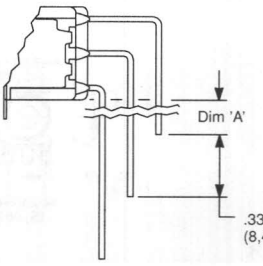
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4 EXTENDED

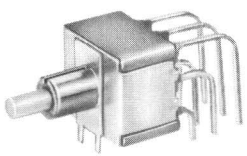
NEW



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)

Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, I seal option.

TERMINATIONS

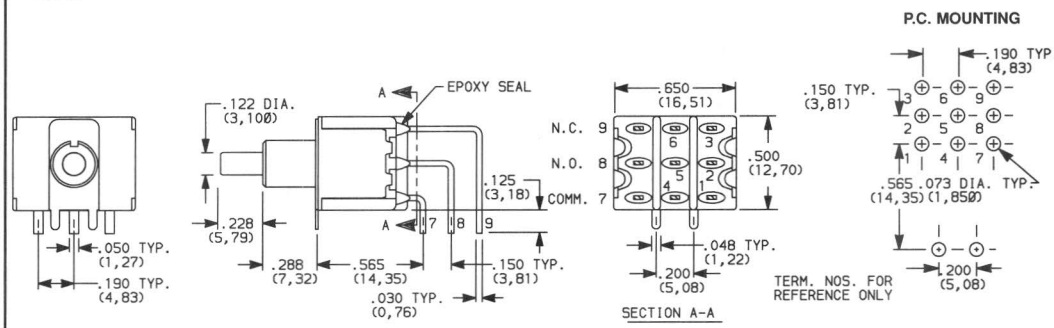


3PDT

AV2

Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, I seal option.

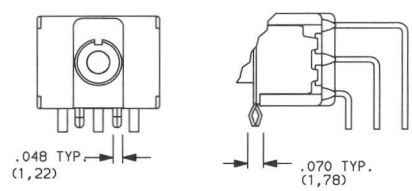
AV2



Part No. Shown: 8321SD9AV2GE

AV3 SNAP-IN

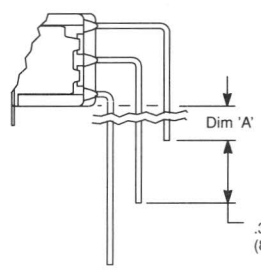
NEW



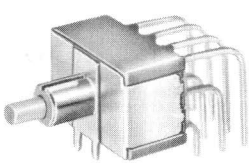
SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4 EXTENDED

NEW



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)

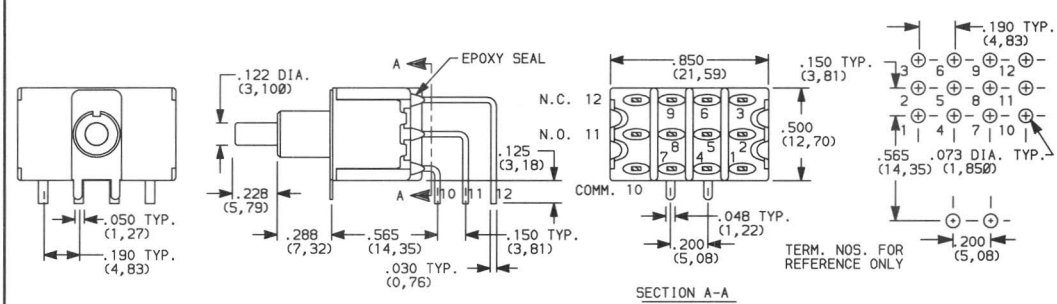


4PDT

AV2

Term. bend radii and lead-in mfg. option.
Not available with JXX actuators, I seal option.

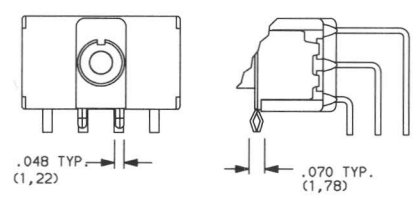
AV2



Part No. Shown: 8421SD9AV2GE

AV3 SNAP-IN

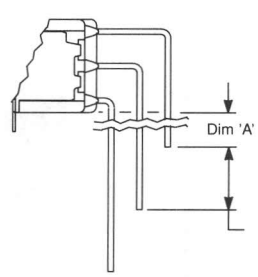
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4 EXTENDED

NEW



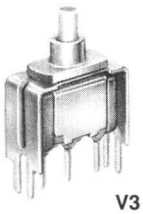
Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)

D

TERMINATIONS

D

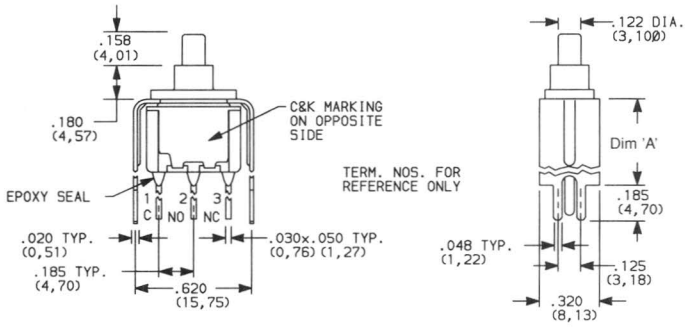
SPDT



V3

Not available with J8X actuators, I seal option.

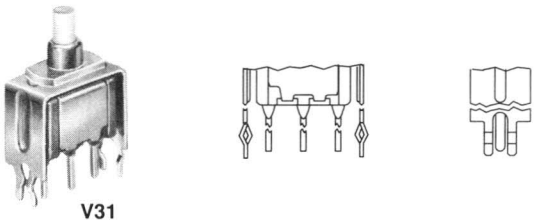
V3-V4-V9 REPLACES V30-V40-V90



Part No. Shown: 8121SD3V__GE

V31-V41-V91 SNAP-IN

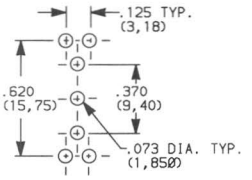
NEW



V31

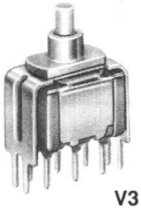
SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

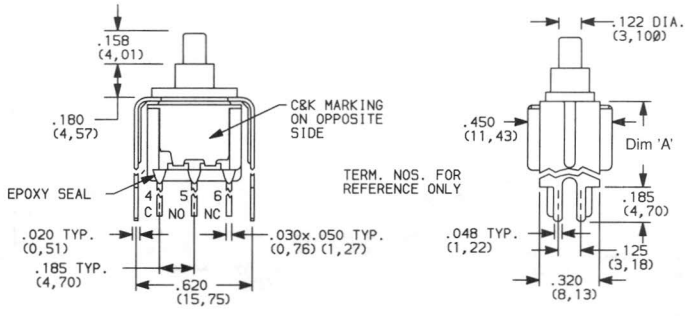
DPDT



V3

Not available with JXX actuators, I seal option.

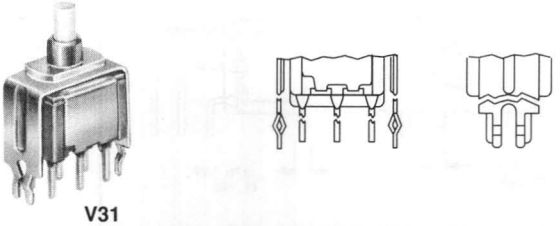
V3-V4-V9 REPLACES V30-V40-V90



Part No. Shown: 8221SD3V__GE

V31-V41-V91 SNAP-IN

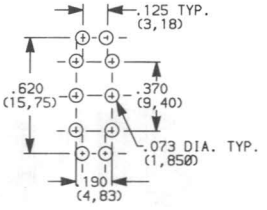
NEW



V31

SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING

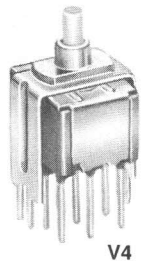


Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

TERMINATIONS

NEW

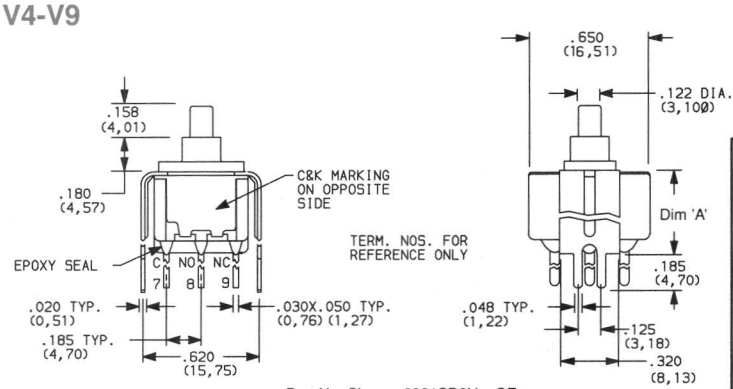
3PDT



V4

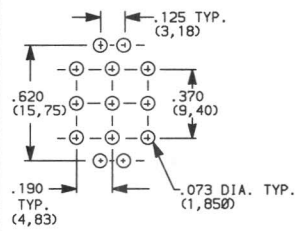
Not available with JXX actuators, I seal option.

V4-V9



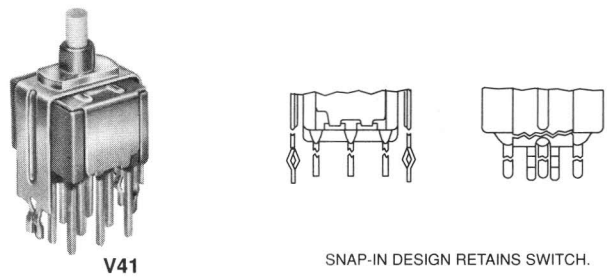
Part No. Shown: 8321SD3V__GE

P.C. MOUNTING



Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V41-V91 SNAP-IN

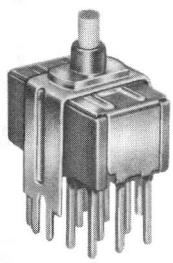


V41

SNAP-IN DESIGN RETAINS SWITCH.

NEW

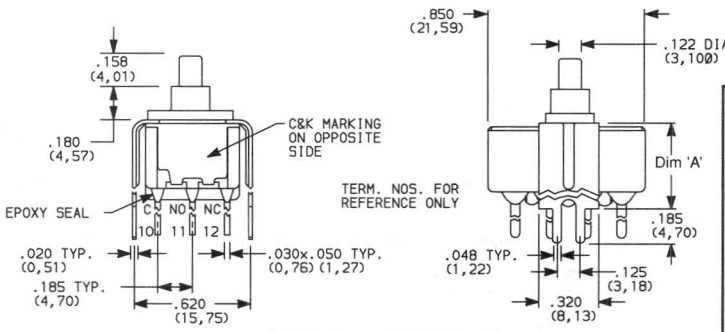
4PDT



V4

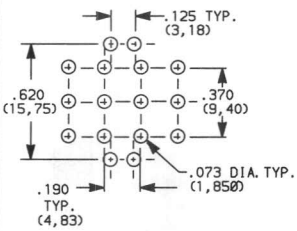
Not available with JXX actuators, I seal option.

V4-V9



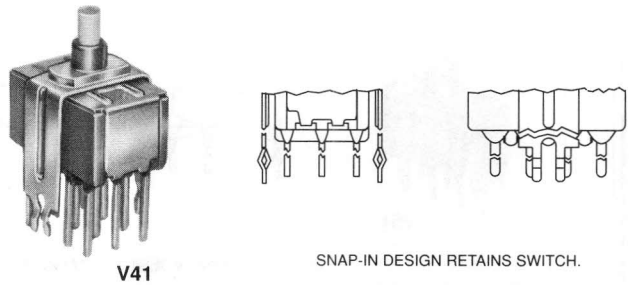
Part No. Shown: 8421SD3V__GE

P.C. MOUNTING



Option	Dim 'A'
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

V41-V91 SNAP-IN



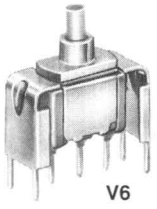
V41

SNAP-IN DESIGN RETAINS SWITCH.

D

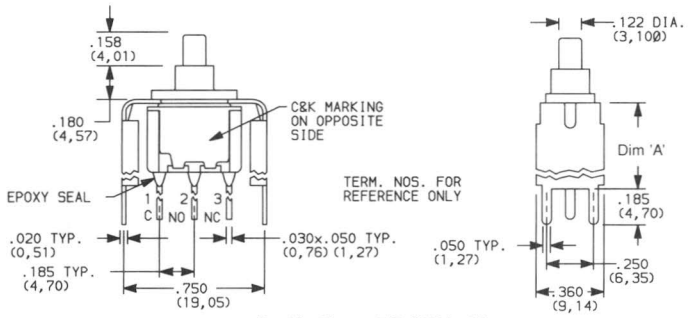
TERMINATIONS

SPDT



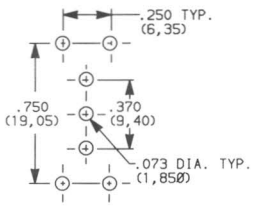
V6

V2-V6-V7-V8 REPLACES V20-V60-V70-V80



Part No. Shown: 8121SD3V__GE

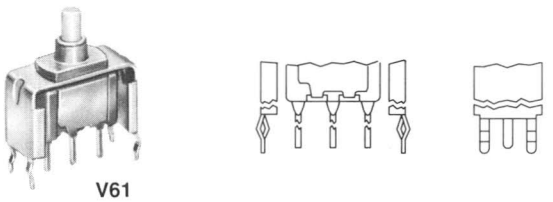
P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V21-V61-V71-V81 SNAP-IN

NEW

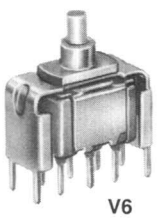


V61

SNAP-IN DESIGN RETAINS SWITCH.

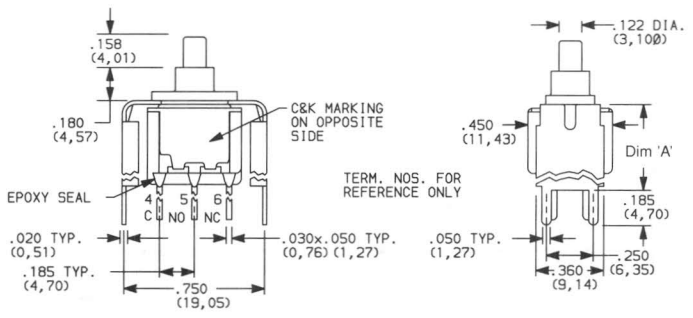
Not available with JXX actuators, I seal option.

DPDT



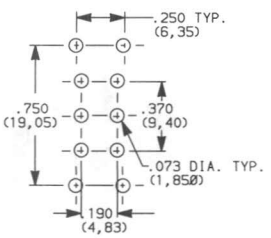
V6

V2-V6-V7-V8 REPLACES V20-V60-V70-V80



Part No. Shown: 8221SD3V__GE

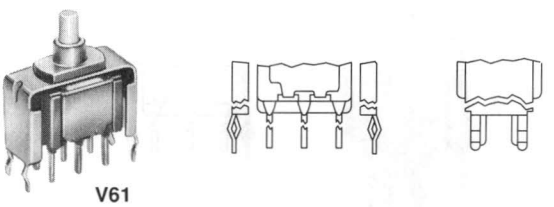
P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

V21-V61-V71-V81 SNAP-IN

NEW



V61

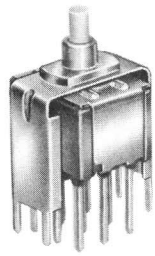
SNAP-IN DESIGN RETAINS SWITCH.

Not available with JXX actuators, I seal option.

TERMINATIONS

NEW

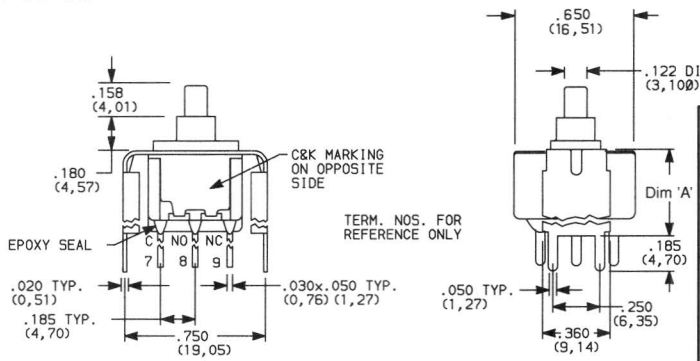
3PDT



V7

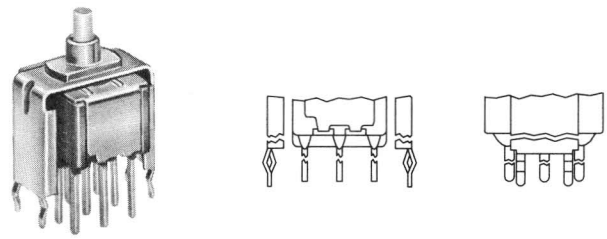
Not available with JXX actuators, I seal option.

V2-V7-V8



Part No. Shown: 8321SD3V__GE

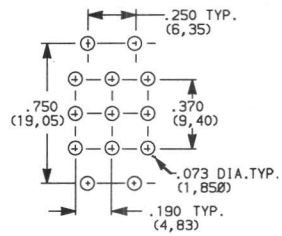
V21-V71-V81 SNAP-IN



V71

SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING

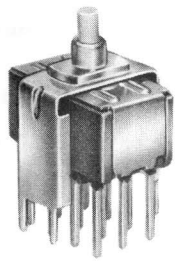


Option	Dim 'A'
V2, V21	.555 (14,10)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

D

NEW

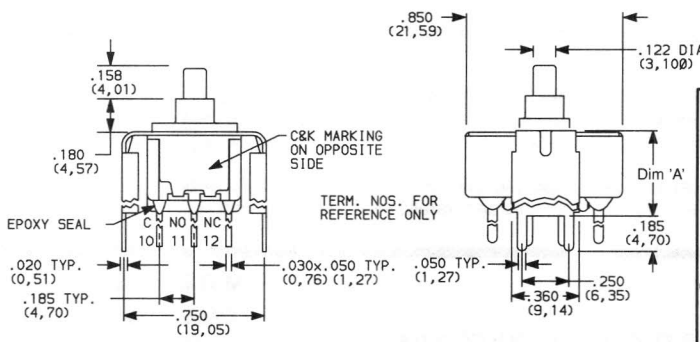
4PDT



V7

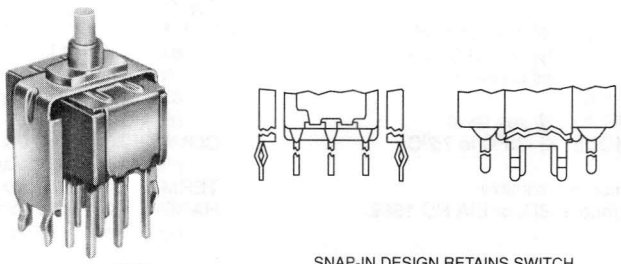
Not available with JXX actuators, I seal option.

V2-V7-V8



Part No. Shown: 8421SD3V__GE

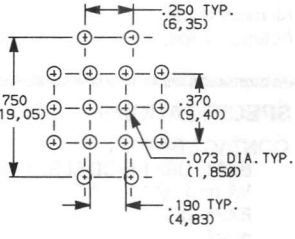
V21-V71-V81 SNAP-IN



V71

SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	8X25 MODELS ONLY: 0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [4]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	8X21, U8X1 MODELS ONLY: 0.4 VA MAX @20 V AC OR DC MAX. OR 1 AMP @120 V AC OR 28 V DC;
L		TIN-LEAD [4]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] ALL CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] N.O. & N.C. CONTACTS: Coin silver, with gold plate over nickel plate.
[3] COMMON CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

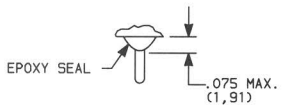
U811-U841 model nos. with all options when ordered with mandatory G or L contact material. See pages D-33 and VIII.

B or K contact material must be ordered with 8X25 models.
G or L contact material must be ordered with 8X21, U8X1 models.
K and L contact materials not available with Z terminations.

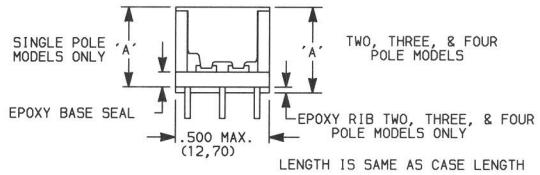
D

SEAL

E (STD.)



I



Poles	Dim 'A'
SP	.410 (10,41)
DP	.440 (11,18)
3P	.505 (12,83)
4P	.505 (12,83)

Available with Z, C, Z3, W-W4 terminations only.

HOW TO ORDER

All available 8020 SERIES SNAP-ACTING MOMENTARY PUSHBUTTON SWITCH options are listed on page D-31, and are described on pages D-33 thru D-46. Switches with standard options are shown on page D-32. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page D-33. Actuator caps, hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

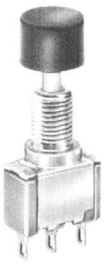
CONTACT RATING:
8X21, U8X1 MODELS: 1 AMP @ 120 V AC or 28 V DC or 0.4 VA max.@ 20 V AC or DC max. (G contact mat'l).
8X25 MODELS: 0.4 VA max. @ 20 V AC or DC max. (B contact mat'l.).
NOTE: Break before make contacts. Multi-pole contact do not make and break simultaneously.
ELECTRICAL LIFE: 60,000 make-and-break cycles at full load.
CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.
OPERATING TEMPERATURE: 8X2X MODELS: -30°C to 75°C.
U8X1 MODELS: -30°C to 65°C.
CAP INSTALLATION FORCE: 10 lbs. max. permissible.
SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

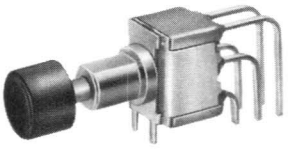
MATERIALS

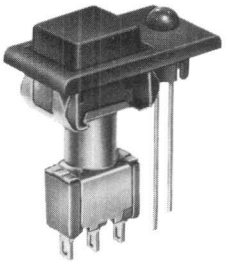
CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP) (UL 94V-0).
PLUNGER: Glass filled nylon or glass filled polyester (UL 94V-0).
CAP & FRAME: Nylon, black, std.
BUSHING: Brass or zinc, nickel plated.
HOUSING: Stainless steel.
SWITCH SUPPORT: Brass or steel, tin plated.
N.O. & N.C. CONTACTS
8X21, U8X1 MODELS: Coin silver, with gold plate over nickel plate (G contact mat'l).
8X25 MODELS: Copper alloy, with gold plate over nickel plate (B contact mat'l.).
COMMON CONTACT & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
TERMINAL SEAL: Epoxy
HARDWARE: Nut & Locking ring – Brass, nickel plated; Lockwasher – Steel, nickel plated.

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

Alternate Action and Momentary Pushbutton Switches



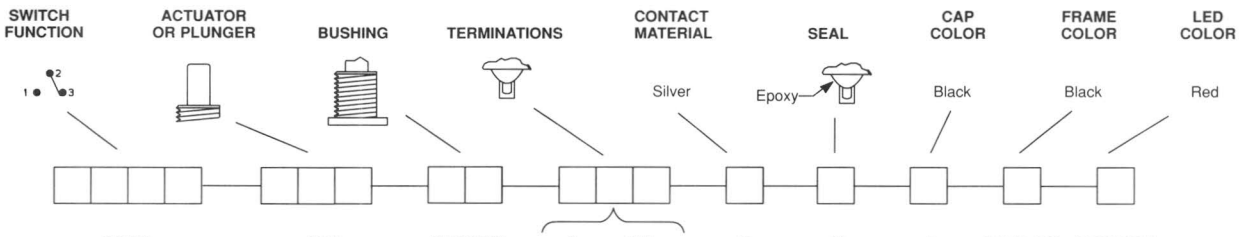




models available, see page D-48.

Easy Build-A-Switch:

Below is a complete listing of available options for 8060 SERIES ALTERNATE ACTION AND MOMENTARY PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page D-48; all available options are shown and described on pages D-48 thru D-56. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-56. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.



SWITCH FUNCTION	ACTUATOR OR PLUNGER	BUSHING	TERMINATIONS	CONTACT MATERIAL		SEAL	CAP COLOR	FRAME COLOR	LED COLOR
8161	J80	(NONE)	A	W	B	E	1	(NONE)	(NONE)
8168	J81	H	A3	W1	G	I	2	1	3
8261	J82	H9	AV1	W3	K		3	2	5
	J86	Y3	AV2	W4	L		4	3	6
	J96		AV3	W5	M		5	4	
	L		AV4	Z	Q		6	5	
	L1		AV5	Z3			7	6	
	S		AW				8	7	
	S1		AW1				9	8	
	S2		AW3					9	
			AW4						
			AW5						
			C						
			V2						
			V3						
			V4						
			V6						
			V7						
			V8						
			V9						
			V21						
			V31						
			V41						
			V61						
			V71						
			V81						
			V91						

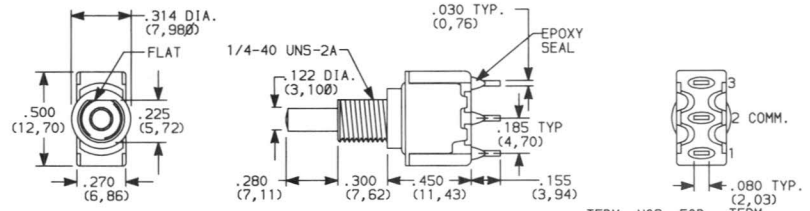
D

SWITCHES WITH STANDARD OPTIONS



SPDT

U.S. PATENT NO. 4,095,070

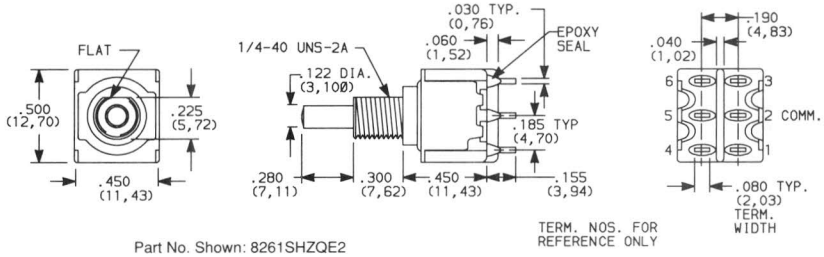


Part No. Shown: 8161SHZQE2



DPDT

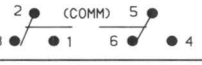
U.S. PATENT NO. 4,095,070



Part No. Shown: 8261SHZQE2

D

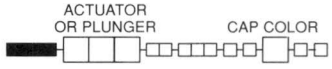
SWITCH FUNCTION

NO. POLES	MODEL* NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	SCHEMATIC
SP	8161	ON	ON	2-3	2-1	
	8168	ON	MOM.			SPDT
DP	8261	ON	ON	2-3,5-6	2-1,5-4	 DPDT

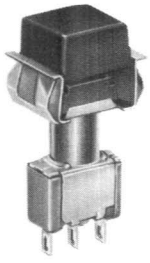
MOM. = MOMENTARY

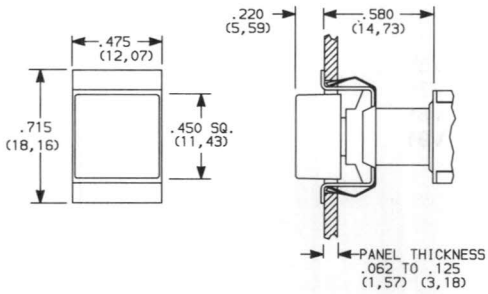
* All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII. Z termination option CSA certified only when ordered with I epoxy base seal.

ACTUATORS – SNAP-IN FRONT MOUNT

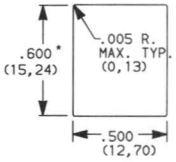


J80





PANEL MOUNTING



* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

No frame color choice required.

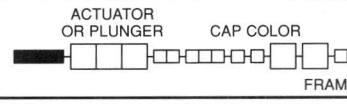
CAP COLOR

OPTION CODE	CAP COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

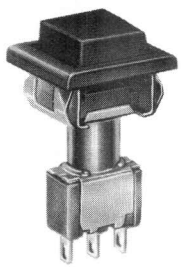
Select cap color from chart. Place option code in appropriate box of ordering format. Cap finish: matte. Custom actuator markings and legends available, consult factory.

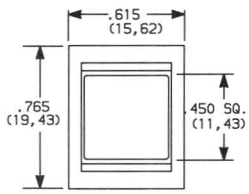
Available with Z, C, Z3, or W-W5 terminations.

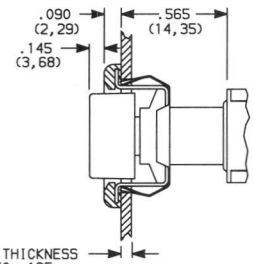
ACTUATORS – SNAP-IN FRONT MOUNT



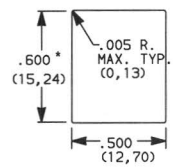
J81 WITH FRAME





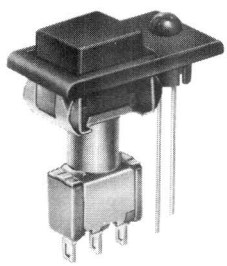


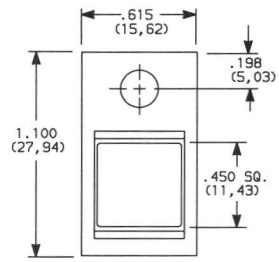
PANEL MOUNTING

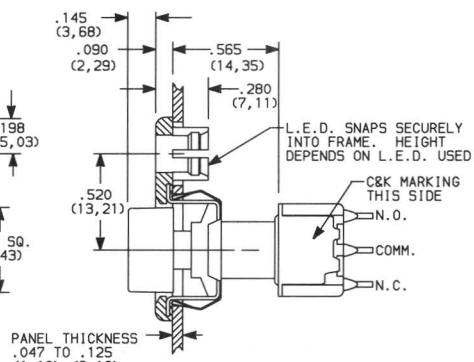


* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

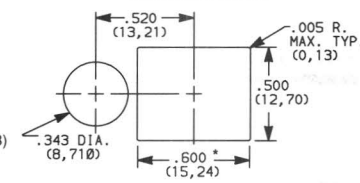
J82 WITH FRAME FOR LED







PANEL MOUNTING



* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk panels.

U.S. PATENT NO. 4,004,120.
LED not supplied. See page IX for LED info.

CAP AND FRAME COLORS

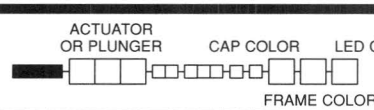
OPTION CODE	CAP AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select cap and frame colors from chart. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator markings and legends available, consult factory. Caps and frames are available separately, see catalog section H.

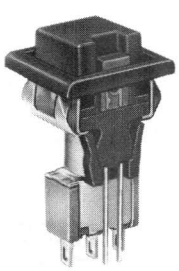
Available with Z, C, Z3, or W-W5 terminations.

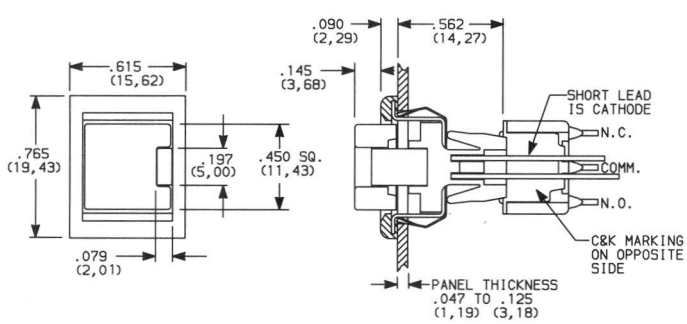
D

ACTUATORS – SNAP-IN FRONT MOUNT

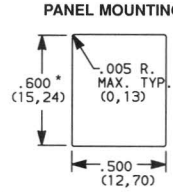


J86 WITH BUILT- IN LED





PANEL MOUNTING



* Increase this dim. to .620/.625 (15,75/15,88) for .091/.125 (2,31/3,18) thk. panels.

See page IX for LED info.

CAP AND FRAME COLORS

OPTION CODE	CAP AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

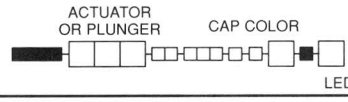
LED COLOR

OPTION CODE	LED COLORS
3	RED (std.)
5	YELLOW
6	GREEN

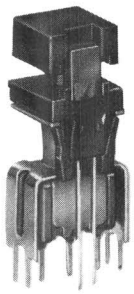
Select cap, frame and LED colors from charts. Place option codes in appropriate boxes of ordering format. Cap and frame finish: matte. Custom actuator legends and markings available, consult factory. Cap and frame available separately, see catalog section H.

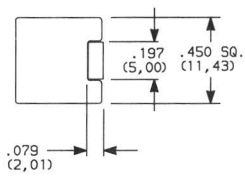
Available with Z, C, Z3 or W-W5 terminations and SPDT models only.

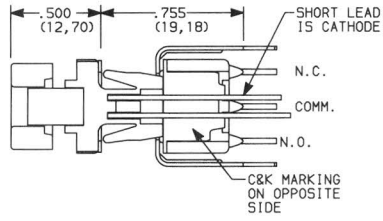
ACTUATORS – P.C. MOUNT



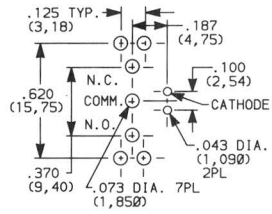
J96 WITH BUILT- IN LED







P.C. MOUNTING



See page IX for LED info.

CAP COLOR

OPTION CODE	CAP COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

LED COLOR

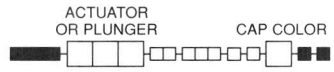
OPTION CODE	LED COLOR
3	RED (std.)
5	YELLOW
6	GREEN

Select cap and LED colors from charts. Place option codes in appropriate boxes of ordering format. Cap finish: matte. Custom actuator legends and markings available, consult factory. Cap available separately, see catalog section H.

Avail. with V3 termination and SPDT model only.

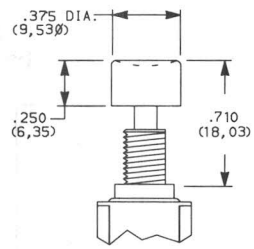
D

PLUNGER WITH CAP

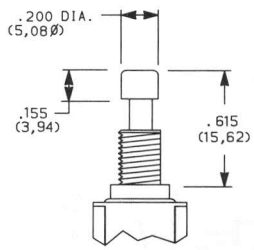


When selecting plunger & cap option, bushing selection must also be made, see next page.

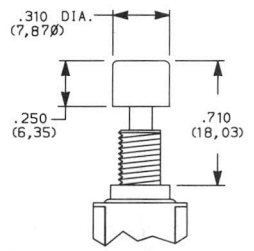
S (STD.)



S1

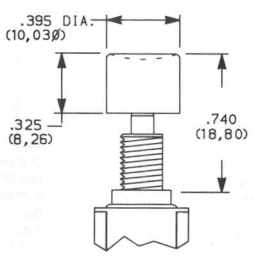


S2

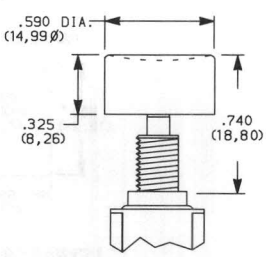


S, S1, S2 plunger material: Glass filled nylon or glass filled polyester (UL 94V-0).

L SNAP-FITTING



L1 SNAP-FITTING



L, L1 plunger material: Brass, nickel plated.

CAP COLOR

OPTION CODE	CAP COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select cap color from chart. Place option code in appropriate box of ordering format. Cap finish: gloss. Caps supplied not installed. Custom actuator legends and markings available, consult factory. Cap available separately, see catalog section H.

Alternate Action and Momentary Pushbutton Switches

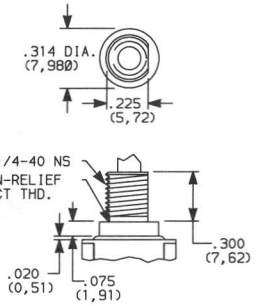
BUSHING

When selecting bushing option, plunger selection must also be made, see previous page. No bushing option choice required when any JXX actuator option is selected.

(NONE)

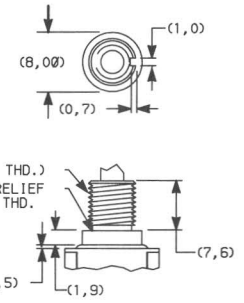
No bushing option choice required when any JXX actuator option is selected.

H
H9 UNTHREADED



H bushing std. with Z, C, Z3, or W-W5 terminations.
H9 bushing std. with A, A3, AW-AW5, AV1-AV5, V2-V91 terminations.

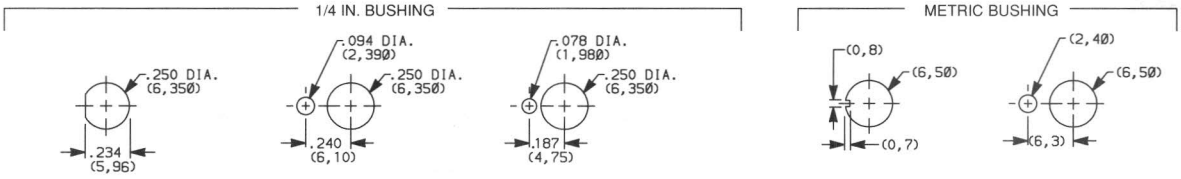
Y3 METRIC



Withstands 12 in.-lbs. of torque with no distortion.

PANEL MOUNTING

Hardware: Two mounting nuts, locking ring and lockwasher supplied std. with threaded bushings. Optional mounting nut and locking ring styles and finishes available, see Hardware, catalog section H.

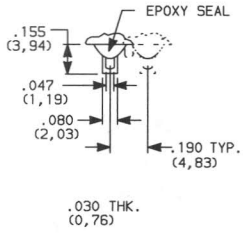


WITHOUT LOCKING RING | WITH STD. LOCKING RING | WITH SMALL LOCKING RING | WITHOUT LOCKING RING | W/LOCKING RING

D

TERMINATIONS

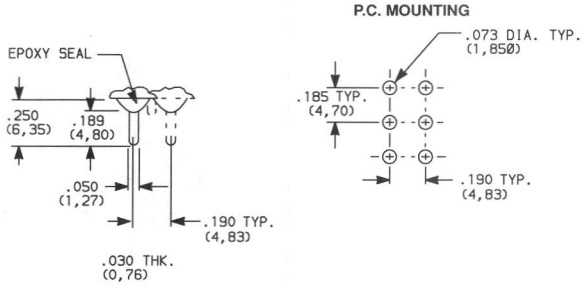
Z (STD.)



SPDT and **DPDT**

Q contact material std.
Not avail. with K, L, or M contact material.

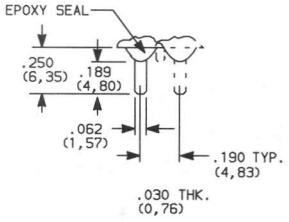
C



SPDT and **DPDT**

Q contact material std.

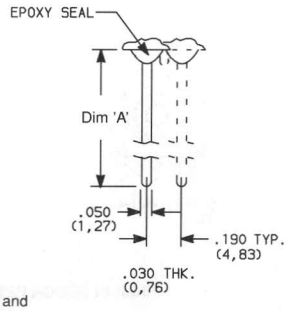
Z3 QUICK CONNECT



SPDT and **DPDT**

Q contact material std.
Not available with K, L, or M contact material.
Mating quick connector available; order part no. 530100000.

W-W1-W3-W4-W5 WIRE WRAP



Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

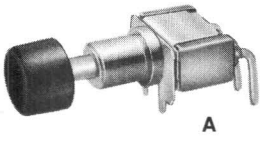
SPDT and **DPDT**

B contact material std.

TERMINATIONS

D

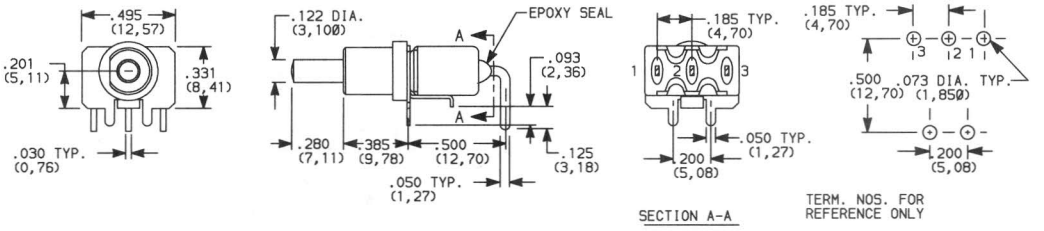
A



A

SPDT

P.C. MOUNTING

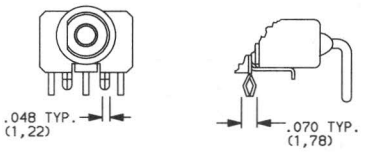


Part No. Shown: 8161SH9ABE2

Term. bend radii and lead-in mfg. option.
B contact material std.
Not available with I seal option.
Note: P.C. pattern must clear switch support leg.

A3 SNAP-IN

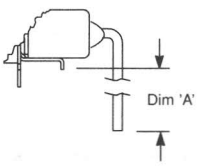
NEW



SNAP-IN DESIGN RETAINS SWITCH.

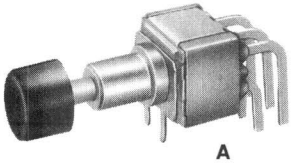
AW-AW1-AW3-AW4-AW5 EXTENDED

NEW



Option	Dim 'A'
AW	.44 (11,2)
AW1	.66 (16,8)
AW3	.14 (3,6)
AW4	.77 (19,6)
AW5	1.02 (25,9)

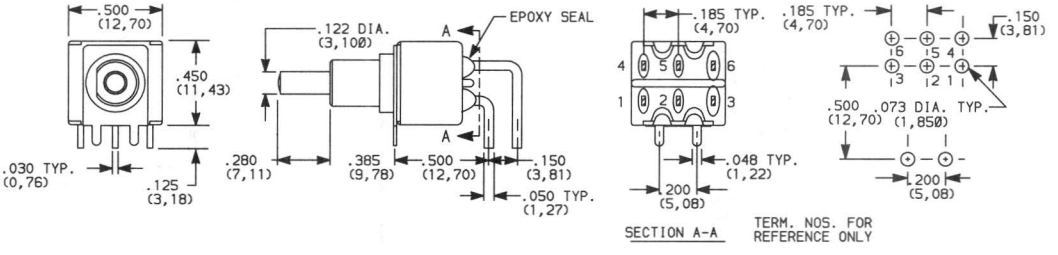
A



A

DPDT

P.C. MOUNTING

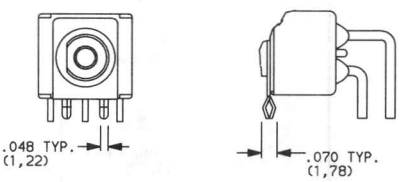


Part No. Shown: 8261SH9ABE2

Term. bend radii and lead-in mfg. option.
B contact material std.
Not available with I seal option.

A3 SNAP-IN

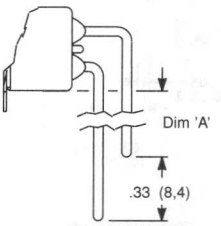
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AW-AW1-AW4-AW5 EXTENDED

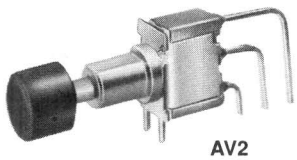
NEW



Option	Dim 'A'
AW	.19 (4,8)
AW1	.40 (10,2)
AW4	.50 (12,7)
AW5	.74 (18,8)

TERMINATIONS

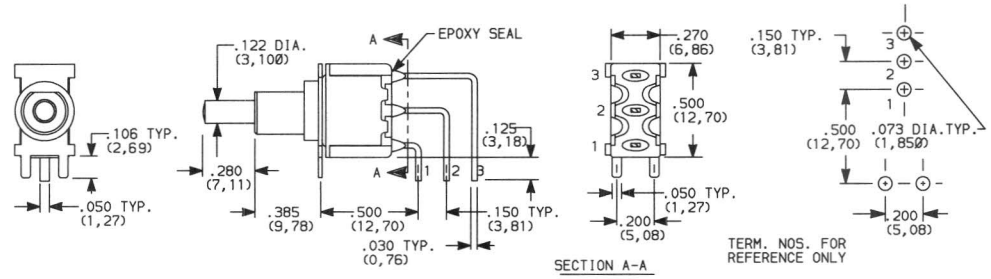




AV2

SPDT

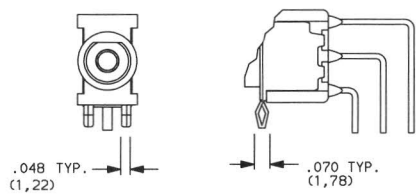
AV2



Part No. Shown: 8161SH9AV2BE2

AV3 SNAP-IN

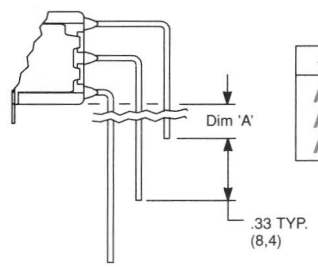
NEW



SNAP-IN DESIGN RETAINS SWITCH.

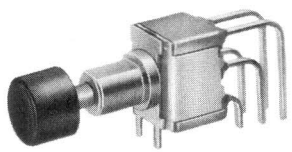
AV1-AV4-AV5 EXTENDED

NEW



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)

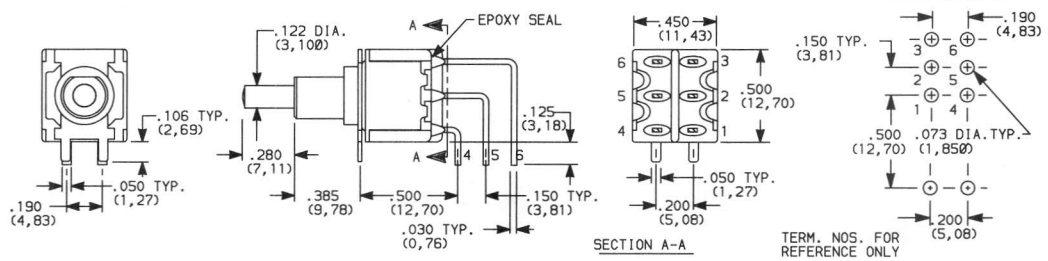
Term. bend radii and lead-in mfg. option.
B contact material std.
Not available with I seal option.



AV2

DPDT

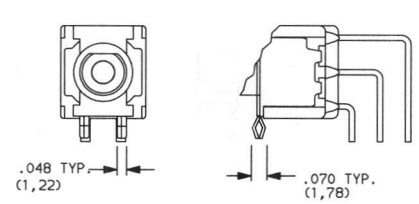
AV2



Part No. Shown: 8261SH9AV2BE2

AV3 SNAP-IN

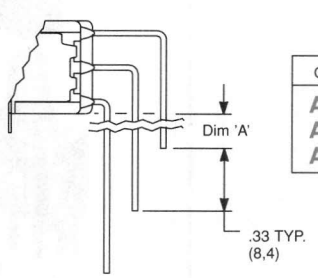
NEW



SNAP-IN DESIGN RETAINS SWITCH.

AV1-AV4-AV5 EXTENDED

NEW



Option	Dim 'A'
AV1	.15 (3,8)
AV4	.24 (6,1)
AV5	.48 (12,2)

Term. bend radii and lead-in mfg. option.
B contact material std.
Not available with I seal option.

D

TERMINATIONS

D

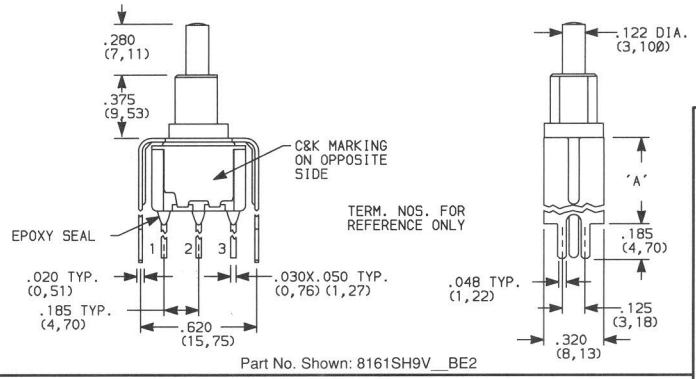
SPDT



V3

B contact material std.
Not available with I seal option.

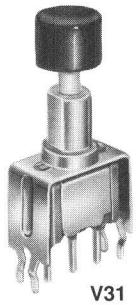
V3-V4-V9 REPLACES V30-V40-V90



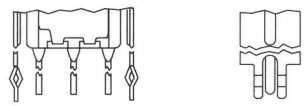
Part No. Shown: 8161SH9V__BE2

V31-V41-V91 SNAP-IN

NEW

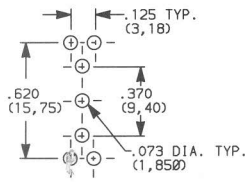


V31



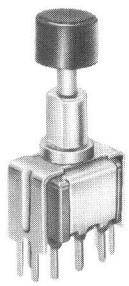
SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

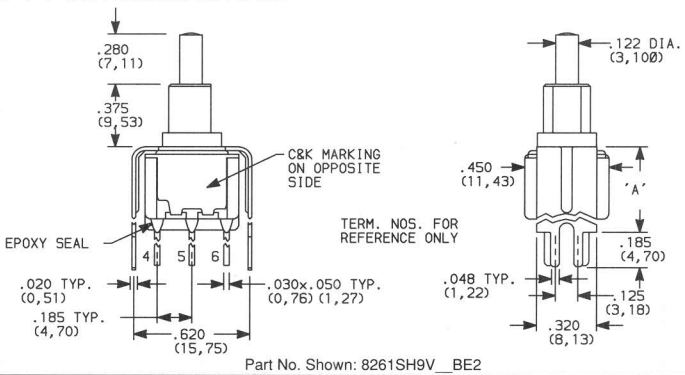
DPDT



V3

B contact material std.
Not available with I seal option.

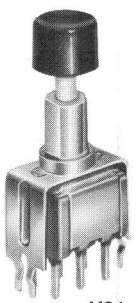
V3-V4-V9 REPLACES V30-V40-V90



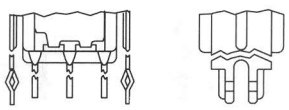
Part No. Shown: 8261SH9V__BE2

V31-V41-V91 SNAP-IN

NEW

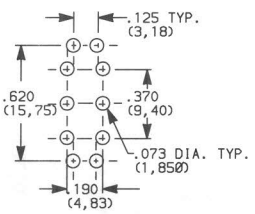


V31



SNAP-IN DESIGN RETAINS SWITCH.

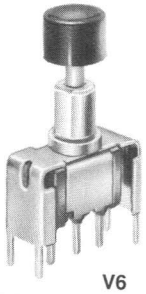
P.C. MOUNTING



Option	Dim 'A'
V3, V31	.460 (11,68)
V4, V41	.630 (16,00)
V9, V91	1.150 (29,21)

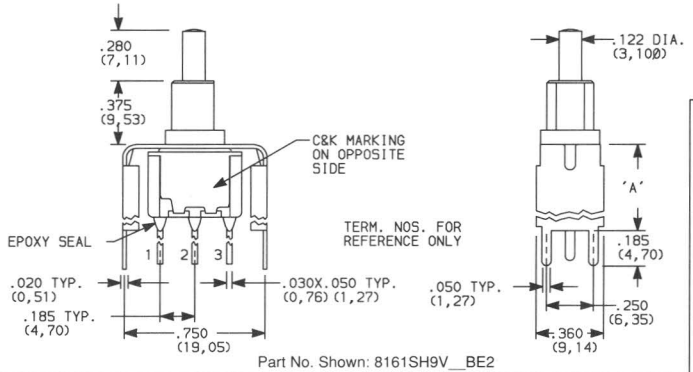
TERMINATIONS

SPDT



V6

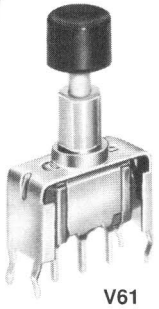
V2-V6-V7-V8 REPLACES V20-V60-V70-V80



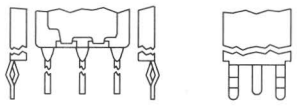
Part No. Shown: 8161SH9V__BE2

V21-V61-V71-V81 SNAP-IN

NEW

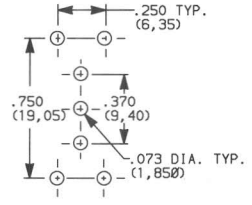


V61



SNAP-IN DESIGN RETAINS SWITCH.

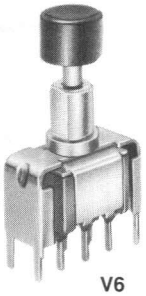
P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

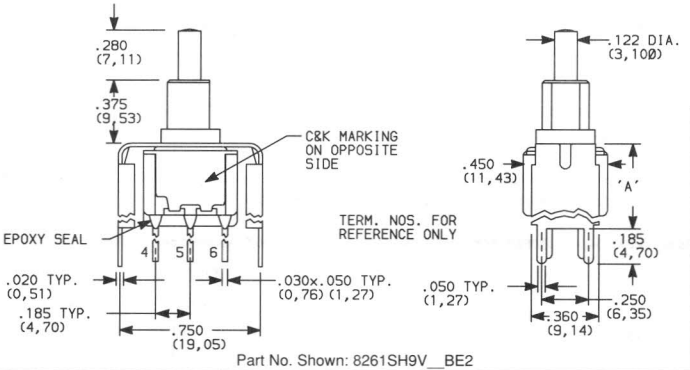
B contact material std.
Not available with I seal option.

DPDT



V6

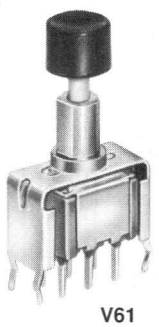
V2-V6-V7-V8 REPLACES V20-V60-V70-V80



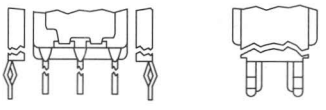
Part No. Shown: 8261SH9V__BE2

V21-V61-V71-V81 SNAP-IN

NEW

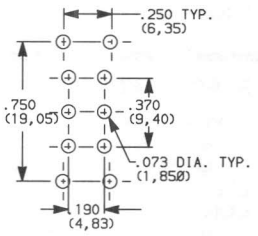


V61



SNAP-IN DESIGN RETAINS SWITCH.

P.C. MOUNTING



Option	Dim 'A'
V2, V21	.555 (14,10)
V6, V61	.460 (11,68)
V7, V71	.630 (16,00)
V8, V81	.953 (24,21)

B contact material std.
Not available with I seal option.

D

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	6 AMPS @120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @20 V AC OR DC MAX. OR 6 AMPS @120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

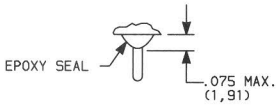
B contact material std. with all terminations except Z, C, Z3.
Q contact material std. with Z, C, Z3 terminations.
K, L, M contact materials not available with Z terminations.

All models with all options when ordered with G, L, M or Q contact material. See pages D-48 and VIII. Z termination option CSA certified only when ordered with I epoxy base seal.

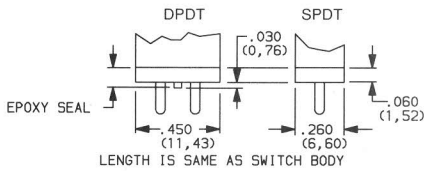
D

SEAL

E (STD.)



I



Available with Z, C, Z3, W–W5 terminations only.

HOW TO ORDER

All available 8060 SERIES ALTERNATE ACTION AND MOMENTARY PUSHBUTTON SWITCH options are listed on page D-47, and are described on pages D-48 thru D-56. Switches with standard options are shown on page D-48. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant and are shown for clarity only.

All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page D-48. Actuator caps, hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
6 AMPS @ 120 V AC or 28 V DC; 3 AMPS @ 250 V AC (Q contact mat'l).
ELECTRICAL LIFE: 50,000 make-and-break cycles at full load.
CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 1,000 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30°C to 65°C
SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).
CAP INSTALLATION FORCE: 10 lbs. max. permissible.

MATERIALS

CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP) (UL 94V-0).
PLUNGER: S, S1, S2 Options: Glass filled nylon or glass filled polyester (UL 94V-0).
L, L1 Options: Brass, nickel plated..
CAP & FRAME: Nylon, black std.
BUSHING: Brass or zinc, nickel plated.
HOUSING: Stainless steel.
SWITCH SUPPORT: Brass or steel, tin plated.
END CONTACTS: Coin silver, silver plated (Q contact mat'l).
CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l).
TERMINAL SEAL: Epoxy
HARDWARE: Nut & Locking ring– Brass, nickel plated; Lockwasher – Steel, nickel plated.

Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

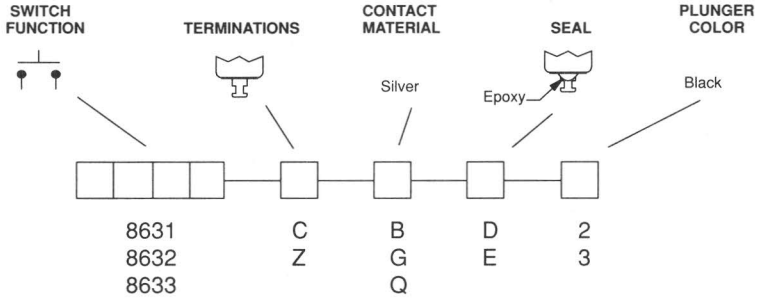




models available, see page D-58.

Easy Build-A-Switch:

Below is a complete listing of available options for 8600 SERIES MICROMINIATURE PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages D-57 and D-58. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-58. Actuator caps, hardware and accessories are available separately, see catalog section H.



D

SWITCH FUNCTION

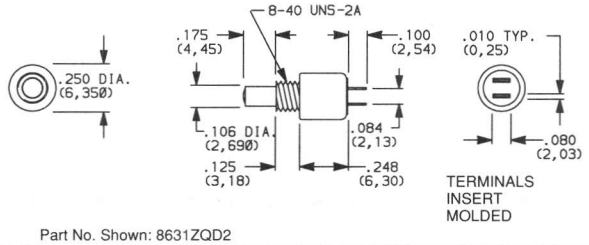
OPTION CODE	SWITCH FUNC. POS. 1	SWITCH FUNC. POS. 2
8631	OFF	MOM.

Schematic:

N.O.
Total Travel: .050 (1,27)
Actuation Force: 5 OZ. (140g)

MOM. = MOMENTARY





Part No. Shown: 8631ZQD2

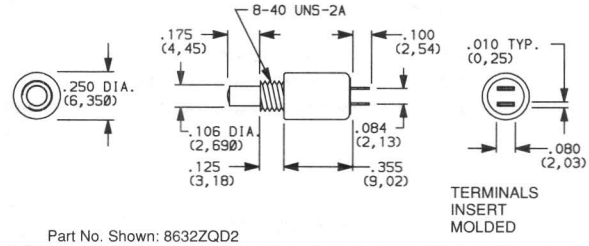
OPTION CODE	SWITCH FUNC. POS. 1	SWITCH FUNC. POS. 2
8632	OFF	MOM.

Schematic:

N.O. w/Overtravel
Total Travel: .080 (2,03)
Overtravel: .015 Min. ((0,38)
Actuation Force: 5 OZ. (140g)

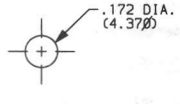
MOM. = MOMEMTARY





Part No. Shown: 8632ZQD2

PANEL MOUNTING



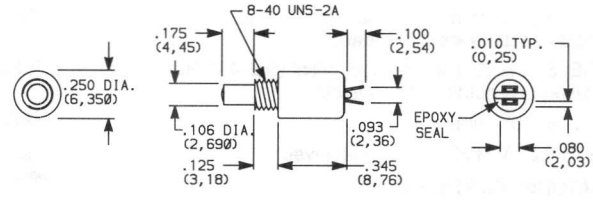
HARDWARE:
One mounting nut supplied std.

OPTION CODE	SWITCH FUNC. POS. 1	SWITCH FUNC. POS. 2
8633	OFF	MOM.

Schematic:

N.C.
Total Travel: .040 (1,02)
Actuation Force: 5 OZ. (140g)

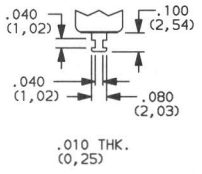




Part No. Shown: 8633ZQE2

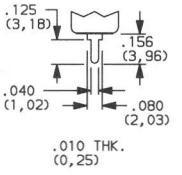
TERMINATIONS

Z (STD.)



Q contact material std.

C



Q contact material std.
Avail. with 8631, 8632 models only.

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
Q	SILVER [4]	SILVER [5]	POWER	8631, 8632 MODELS: 500 mA @120 V AC OR 28 V DC; 250 mA @ 250 V AC. 8633 MODELS: 250 mA @120 V AC OR 28 V DC; 125 mA @ 250 V AC.
G	GOLD OVER SILVER [2]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @20 V AC OR DC MAX. OR 8631, 8632 MODELS: 500 mA @ 120 V AC OR 28 V DC; 250 mA @250 V AC. 8633 MODELS: 250 mA @120 V AC OR 28 V DC; 125 mA @ 250 V AC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] CONTACTS: Coin silver, with gold plate over nickel plate.
[3] TERMINALS: Copper alloy, with gold plate over nickel plate.
8633 model only: coin silver, with gold plate over nickel plate.
[4] CONTACTS: Coin silver, silver plated.
[5] TERMINALS: Copper alloy, silver plated.
8633 model only: coin silver.

Q contact material std. with Z, C terminations.

8631, 8632 models cULus with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

D

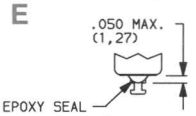
SEAL

D

NO SEAL

Std. on 8631, 8632 models.
Not avail. on 8633 model.

E



Std. on 8633 model only.

PLUNGER COLOR

2 BLACK (STD.)

3 RED

HOW TO ORDER

All available 8600 SERIES MICROMINIATURE PUSHBUTTON SWITCH options are listed on page D-57, and are described on pages D-57 and D-58. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have either epoxy terminal seal or insert molded terminals, and are compatible with 'bottom-wash' PC board cleaning methods. cULus models available, see above. Actuator caps, hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
8631 and 8632 MODELS: 500 mA @ 120 V AC or 28 V DC;
250 mA @250 V AC. 8633 MODEL: 250 mA @ 120 V AC or 28 V DC;
125 mA @ 250 V AC (Q contact mat'l).

ELECTRICAL LIFE:
8631 and 8633 MODELS: 250,000 actuations at full load.
8632 MODEL: 100,000 actuations at full load.

CONTACT RESISTANCE: Below 30 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C.

SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9.

MATERIALS

CASE: Glass filled phenolic or diallyl phthalate (DAP), (UL94V-0).

PLUNGER: Glass filled nylon (UL94V-0), black std.

BUSHING: Brass, nickel plated.

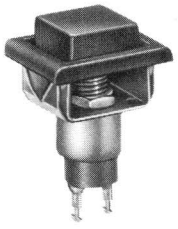
CONTACTS: Coin silver, silver plated (Q contact mat'l).

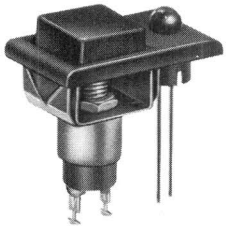
TERMINALS: 8631, 8632 MODELS: Copper alloy, silver plated.
8633 MODELS: Coin silver (Q contact mat'l).

TERMINAL SEAL: 8633 MODELS ONLY: Epoxy.
8631, 8632 MODELS: Terminals insert molded.

HARDWARE: Nut – Brass, nickel plated.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

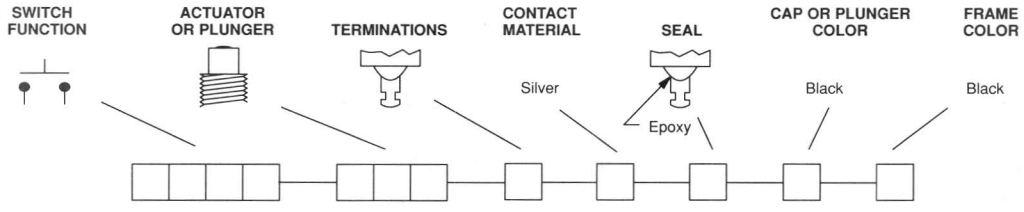





models available, see page D-60.

Easy Build-A-Switch:

Below is a complete listing of available options for 8500 SERIES SUBMINIATURE PUSHBUTTON SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages D-60 thru D-62. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-62. Hardware and accessories are available separately, see catalog section H. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.

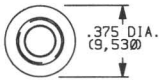


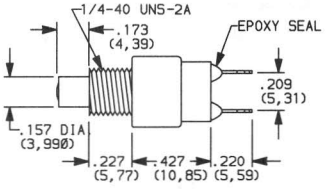
8531	J80	C	B	E	1	(NONE)
8532	J81	Z	G		2	1
8533	J82		Q		3	2
8534	M				4	3
8551	S				5	4
8552	T				6	5
	T1				7	6
					8	7
					9	8
						9

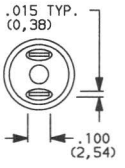
SWITCH FUNCTION







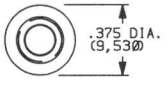


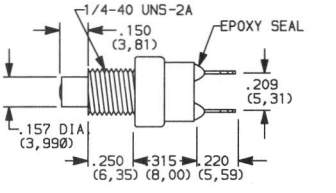


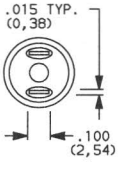
8531 – 1 Amp
8551 – 3 Amps

Part No. Shown: 8531MZQE2





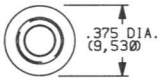


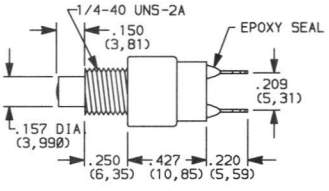


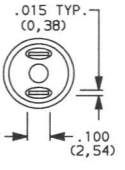
8532 – 1 Amp
8552 – 3 Amps

Part No. Shown: 8532MZQE2





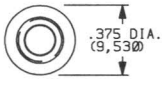


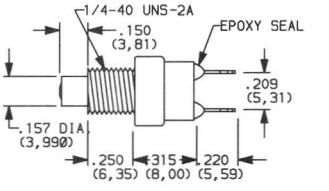


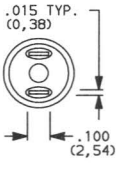
8533 – 1 Amp

Part No. Shown: 8533MZQE2





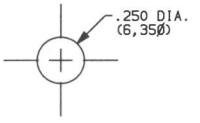




8534 – 1 Amp

Part No. Shown: 8534MZQE2

PANEL MOUNTING



Hardware: Mounting hardware included, see HOW TO ORDER, page D-62.

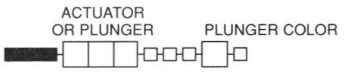
D

NO. POLES	MODEL NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	TOTAL TRAVEL	ACTUATION FORCE	SCHEMATIC
SP	8531	OFF	MOM.	.110 (2,79) w/ Overtravel .020 (0,51) MIN.	9 OZ. (255g)	N.O. W/OVERTRAVEL
	8551					
	8532	OFF	MOM.	.060 (1,52)	10 OZ. (285g)	N.O.
	8552					
	8533	ON	MOM.	.065 (1,65) w/ Pretravel .020 (0,51) MIN.	9 OZ. (255g)	N.C. W/PRETRAVEL
	8534	ON	MOM.	.040 (1,02)	8.5 OZ. (240g)	N.C.

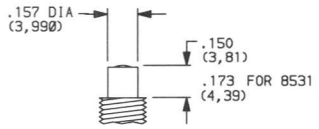
MOM. = MOMENTARY

All models UL with all options when ordered with G or Q contact material. See AGENCY APPROVALS, page VIII.

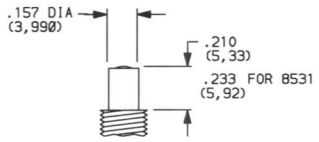
PLUNGER



M (STD.)



S

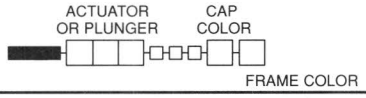


PLUNGER COLOR

2 BLACK (STD.)

3 RED

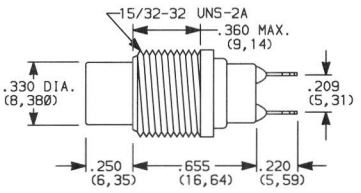
ACTUATOR



T



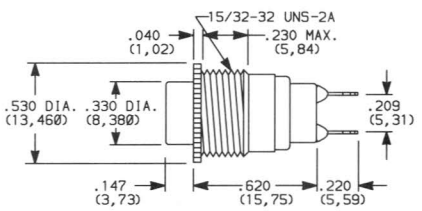
No frame color choice required.



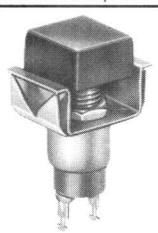
T1



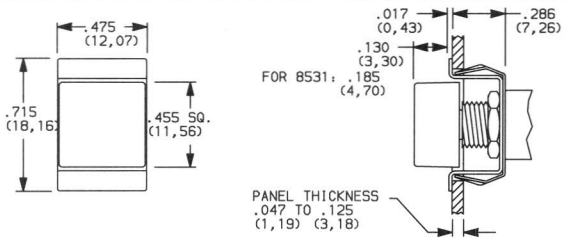
Available with 8532 and 8534 models only.
No frame color choice required.



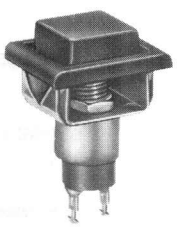
J80

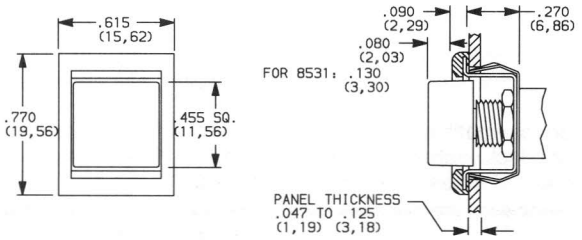


No frame color choice required.

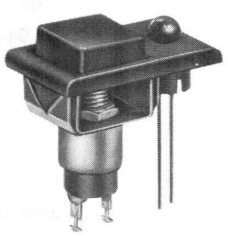


J81

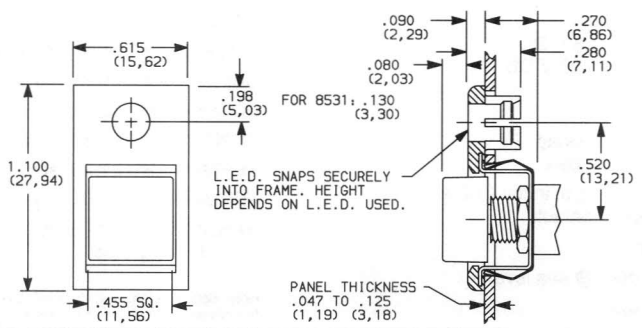




J82



U.S. PATENT NO. 4,004,120
LED not included.
See page IX for LED information.

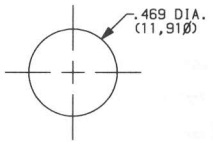


CAP AND FRAME COLORS

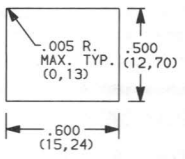
OPTION CODE	CAP AND FRAME COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select cap and frame colors (where applicable) from chart. Place option code(s) in appropriate box(es) of ordering format. J80, J81, J82 cap and frame finish: matte. T, T1 cap finish: gloss. Custom actuator markings and legends available, consult factory. Mounting hardware included, see HOW TO ORDER, page D-62. Actuators and hardware are available separately, see catalog section H.

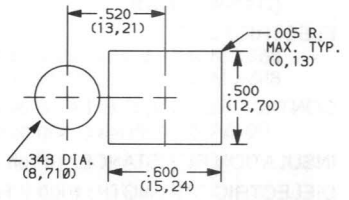
PANEL MOUNTING T – T1



PANEL MOUNTING J80 – J81



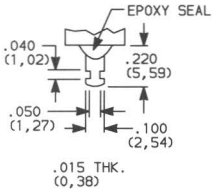
PANEL MOUNTING J82



D

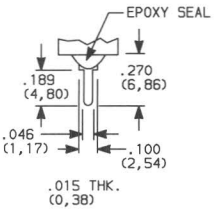
TERMINATIONS

Z (STD.)



Q contact material std.

C



Q contact material std.

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
Q	SILVER [4]	SILVER [5]	POWER	853X MODELS: 1 AMP @ 120 V AC OR 28 V DC. 855X MODELS: 3 AMPS @ 120 V AC OR 28 V DC.
G	GOLD OVER SILVER [2]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @20 V AC OR DC MAX. OR 853X MODELS: 1 AMP @120 V AC OR 28 V DC. 855X MODELS: 3 AMPS @120 V AC OR 28 V DC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

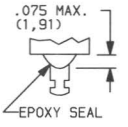
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] CONTACTS: Coin silver, with gold plate over nickel plate.
[3] TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] CONTACTS: Coin silver, silver plated.
[5] TERMINALS: Copper alloy, silver plated.

Q contact material std. with Z, C terminations.

All models with all options when ordered with G or Q contact material.
See AGENCY APPROVALS, page VIII.

SEAL

E



HOW TO ORDER

All available 8500 SERIES SUBMINIATURE PUSHBUTTON SWITCH options are listed on page D-59, and are described on pages D-60 thru D-62. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods. models available, see above. Hardware: One mounting nut and lockwasher supplied standard, where applicable (except T actuator option: two mounting nuts supplied standard). Hardware and accessories are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
853X MODELS: 1 AMP @ 120 V AC or 28 V DC;
855X MODELS: 3 AMPS @ 120 V AC or 28 V DC
(Q contact mat'l).

ELECTRICAL LIFE:
853X MODELS: 250,000 actuations at full load.
855X MODELS: 10,000 actuations at full load.

CONTACT RESISTANCE: Below 30 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C.

MATERIALS

CASE: Glass filled phenolic or diallyl phthalate (DAP). (UL 94V-0).

PLUNGER: Phenolic or glass filled polyester, black std. (UL 94V-0).

CAP & FRAME: Nylon, black std.

BUSHING: Brass, nickel plated.

CONTACTS: Coin silver, silver plated (Q contact mat'l).

TERMINALS: Copper alloy, silver plated (Q contact mat'l).

TERMINAL SEAL: Epoxy.

HARDWARE: Nut – Brass, nickel plated; Lockwasher – Steel, bright nickel plated.

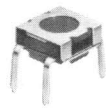
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

KT Series

NEW

Sealed* Miniature Key Switches

* Process sealed – withstands soldering and cleaning processes.





- **ULTRA-MINIATURE LOW PROFILE DESIGN – APPROX. .250 IN. (6 mm) SQ.**
- **SEALED CONSTRUCTION – INTERNAL SILICONE RUBBER ACTUATOR SEAL AND INSERT MOLDED TERMINALS STANDARD.**
- **PROCESS COMPATIBLE – WITHSTANDS SOLDERING AND CLEANING PROCESSES – HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**

WITH C TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
KT11BOCM	OFF	MOM.
KT11B1CM	OFF	MOM.
Conn. Terms.	OPEN	1-3
Schematic SPST	1 2 3 4	

MOM. = MOMENTARY

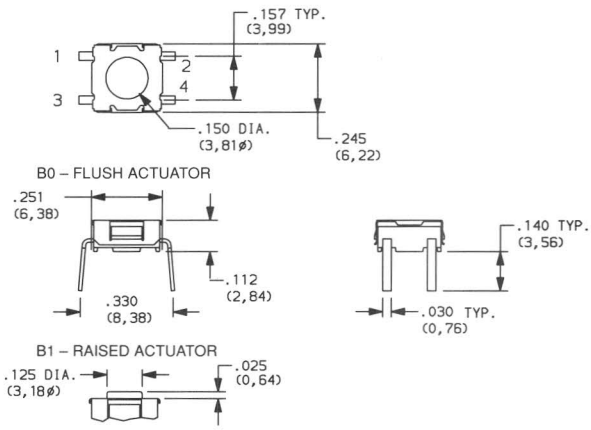


B0



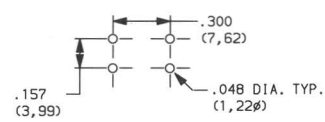
B1

SPST



D

P.C. MOUNTING



HOW TO ORDER

Complete part numbers for KT SERIES MINIATURE KEY SWITCHES are shown above. Additional KT Series surface mount models – see catalog section A, pages A-17 and A-18.

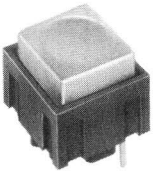
SPECIFICATIONS

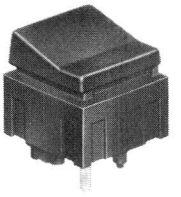
CONTACT RATING: 1.0 VA max. @ 50 V AC or DC max.
MECHANICAL & ELECTRICAL LIFE: 100,000 make-and-break cycles at full load.
CONTACT RESISTANCE: Below 100 milliohms typ. initial @ 2-4 V DC, 100 mA.
INSULATION RESISTANCE: 10^9 ohms min.
DIELECTRIC STRENGTH: 250 V RMS min. @ sea level.
OPERATING TEMPERATURE: -40° C to 90° C.
SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).
PACKAGING: Switches supplied in rigid dispensing tubes.

MATERIALS

BASE: LCP (UL 94V-0).
ACTUATOR BUTTON AND SEAL: Silicone rubber.
HOUSING: Stainless steel.
MOVABLE CONTACT: Stainless steel, silver plated.
STATIONARY CONTACTS: Copper alloy, silver plated.
TERMINALS: Copper alloy, with tin-lead alloy over nickel plate. All terminals insert molded.

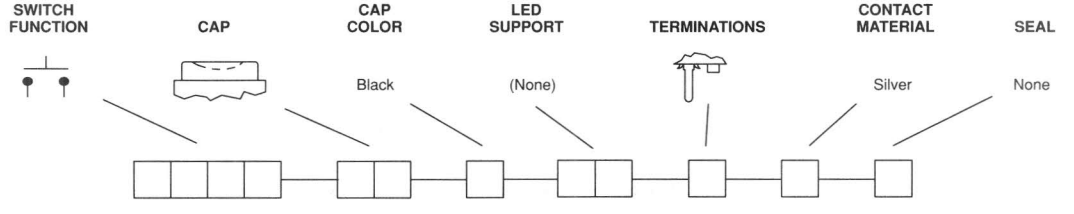
Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.





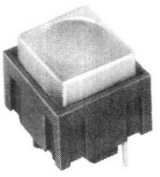
Easy Build-A-Switch:

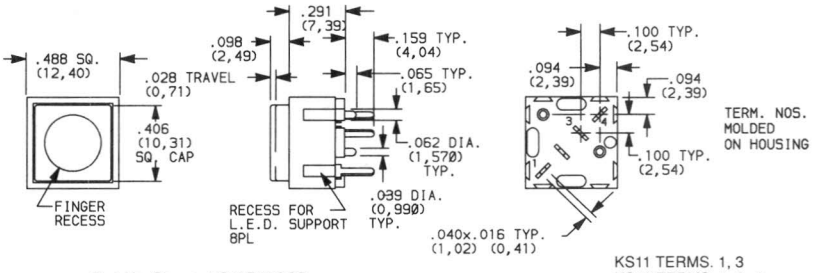
Below is a complete listing of available options for KS SERIES PUSHBUTTON KEY SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages D-64 thru D-66. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page D-66. Hardware and accessories are available separately, see catalog section H.



SWITCH FUNCTION	CAP	CAP COLOR	LED SUPPORT	TERMINATIONS	CONTACT MATERIAL	SEAL
	KS11 KS12	R2 R3	1 2 3 4 5 6 7 8 9	(NONE) S1 S2 S3 S4	C	B G Q	D E

SWITCH FUNCTION



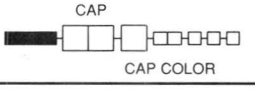


Part No. Shown: KS12R22CQD

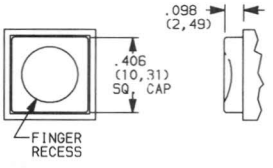
NO. POLES	MODEL NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	SCHEMATIC
SP	KS11	OFF	MOM.	OPEN	1-3	SPST 1 3
	KS12	ON	MOM.	1-4	1-3	SPDT NC 4 1 (COMM) 3 NO

MOM. = MOMENTARY

CAP

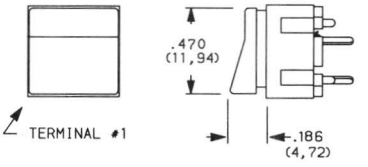


R2 (STD.)



R3

NEW



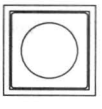
CAP COLOR

OPTION CODE	CAP COLOR
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select cap color from chart. Place option code in appropriate box of ordering format. Cap finish: matte. Custom actuator markings and legends available, consult factory.

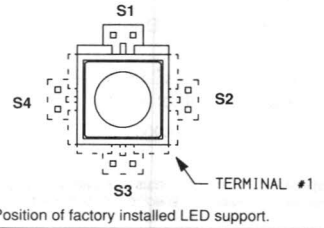
LED SUPPORT

(NONE) (STD.)



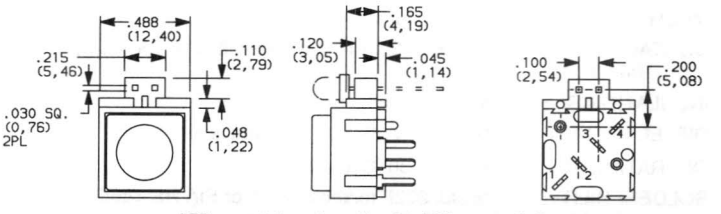
No LED support.

S1-S2-S3-S4



Position of factory installed LED support.

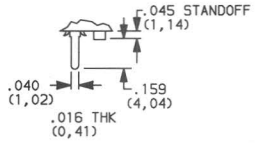
TYPICAL INSTALLATION



LED support shown in position S1. LED not supplied.
LED support also available separately, see catalog section H.

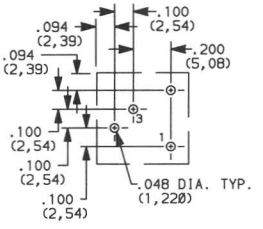
TERMINATIONS

C (STD.)

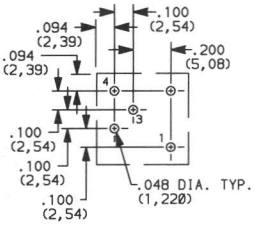


Q contact material std.

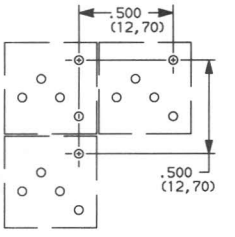
P.C. MOUNTING



KS11



KS12



MULTIPLE SWITCH SPACING

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
Q	SILVER [2]	SILVER [2]	POWER	25 mA MAX. @ 50 V AC OR DC MAX.
G	GOLD OVER SILVER [3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX. @20 V AC OR DC MAX. OR 25 mA MAX. @ 50 V AC OR DC MAX.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

Q contact material std.

[1] MOVABLE CONTACT: Beryllium copper, with gold plate over nickel plate.
STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.

[2] MOVABLE CONTACT: Beryllium copper, silver plated
STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, silver plated.

[3] MOVABLE CONTACT: Beryllium copper, with gold plate over nickel plate over silver plate.
STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate over silver plate.

D

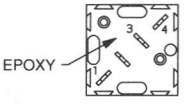
SEAL

D (STD.)

NO SEAL

E

NEW



HOW TO ORDER

All available KS SERIES PUSHBUTTON KEY SWITCH options are listed on page D-64, and are described on pages D-65 and D-66. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

LED support is available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING: 25 mA max. @ 50 V AC or DC max. (Q contact mat'l).

MECHANICAL LIFE: 100,000 actuations.

CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C.

SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

CASE: Glass filled nylon (UL 94 V-0).

ACTUATOR: ABS or polycarbonate – ABS blend, matte finish, black std.

MOVABLE CONTACT: Beryllium copper, silver plated (Q contact mat'l).

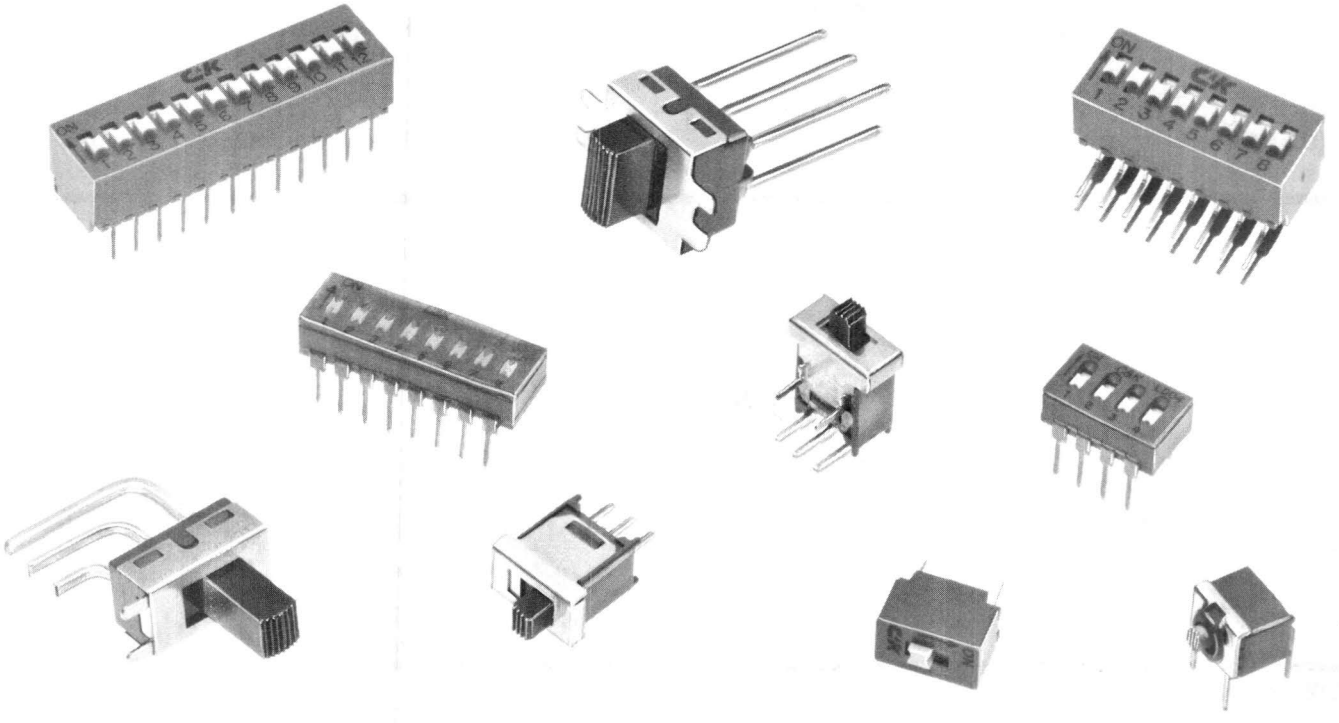
STATIONARY CONTACTS & TERMINALS: Copper alloy, silver plated (Q contact mat'l).

TERMINAL SEAL: Epoxy.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

SECTION E

DIP AND SLIDE SWITCHES

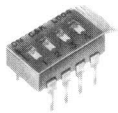


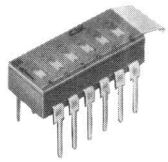
LD Series	Sealed Low Profile DIP Switches	E-2
BD Series	Washable DIP Switches	E-3 thru E-4
GS Series	Sealed Ultra-Miniature Slide Switches	E-5 thru E-6
TS Series	Tiny Slide Switches	E-7 thru E-9
1000 Series	Miniature Slide Switches	E-10 thru E-16

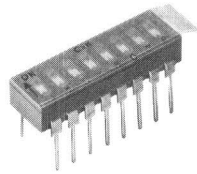
C&K LD Series

Sealed* Low Profile DIP Switches

* Process sealed – withstands soldering and cleaning processes.





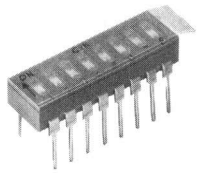


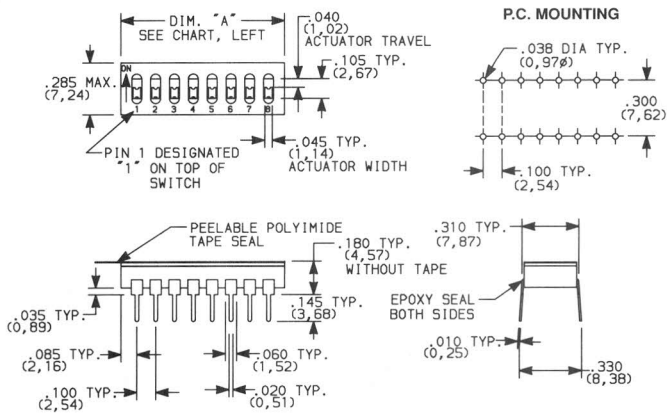
- **MACHINE INSERTABLE – LOW PROFILE.**
- **PROCESS SEALED CONSTRUCTION – WITHSTANDS SOLDERING AND CLEANING PROCESSES – REMOVABLE POLYIMIDE TOP TAPE SEAL STD.**
- **DESIGNED WITH HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **RECESSED SLIDE ACTUATORS AND POSITIVE DETENT – PREVENT ACCIDENTAL ACTUATION.**
- **REDUNDANT PRECIOUS METAL CONTACTS ENSURE RELIABLE SWITCHING.**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**

PART NO.	NO. POS.	DIM. 'A'
LD04	4	.470 (11,94)
LD06	6	.670 (17,02)
LD08	8	.870 (22,10)
Schematic		



SPST





Part No. Shown: LD08

E

HOW TO ORDER

Complete part numbers for LD SERIES SEALED LOW PROFILE DIP SWITCHES are shown above. All switches supplied in 'OFF' position and in rigid dispensing tubes. Additional LD Series surface mount models – see catalog section A, page A-3.

SPECIFICATIONS

SWITCH FUNCTION: SPST– 4, 6, 8, pos.

CONTACT RATING:
Carry: 100 mA max. @ 50 V DC.
Switch: 100 mA max @ 5 V DC or 25 mA max. @ 25 V DC.

MECHANICAL & ELECTRICAL LIFE: 2,000 make-and-break cycles at full load, each circuit.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between adjacent terminals.

CAPACITANCE: 5 pF max. between adjacent terminals.

STORAGE & OPERATING TEMPERATURE: -40°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches supplied in rigid dispensing tubes. Switch pos. 1 denotes pin no. 1. All switch actuators in "OFF" position std. Tape and reel packaging per EIA 481A also available, consult factory.

MATERIALS

CASE & COVER: Glass filled polyester (PET), flame retardant (UL 94V-0).

ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

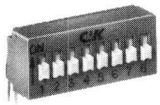
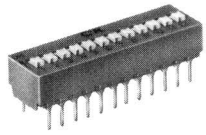
CONTACTS: Precious metal over copper alloy.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

TAPE SEAL: Polyimide.

TERMINAL SEAL: Epoxy. All terminals insert molded.

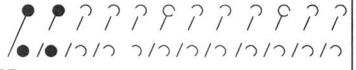
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

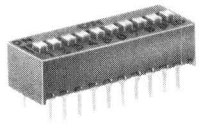
- **PROVEN WASHABLE DESIGN – NO BOOTS, CAPS OR TAPE REQUIRED – OPEN BASE DESIGN ALLOWS CLEANERS TO FLUSH THROUGH.**
- **HIGH TEMPERATURE MATERIALS (UL 94V-0) – WITHSTANDS SOLDERING AND CLEANING TEMPERATURES AND PROCESSES.**
- **SLIDE ACTUATORS WITH POSITIVE DETENT – PREVENT ACCIDENTAL ACTUATION.**
- **RELIABLE WIPING CONTACT MECHANISM.**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**

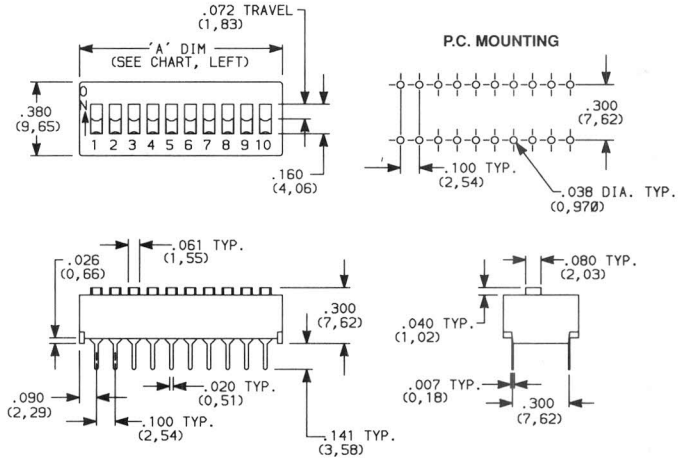
PART NO.	NO. POS.	DIM. 'A'
BD01	1	.180 (4,57)
BD02	2	.280 (7,11)
BD03	3	.380 (9,65)
BD04	4	.480 (12,19)
BD05	5	.580 (14,73)
BD06	6	.680 (17,27)
BD07	7	.780 (19,81)
BD08	8	.880 (22,35)
BD09	9	.980 (24,89)
BD10	10	1.080 (27,43)
BD12	12	1.280 (32,51)

Schematic



SPST





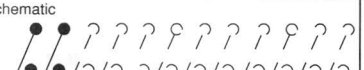
Part No. Shown: BD10

E

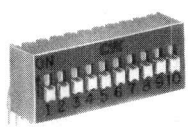
WITH AV TERMINAL STYLE

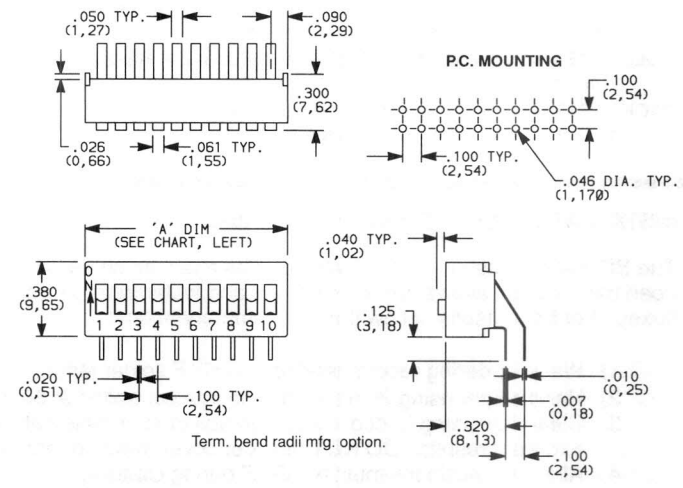
PART NO.	NO. POS.	DIM. 'A'
BD02AV	2	.280 (7,11)
BD03AV	3	.380 (9,65)
BD04AV	4	.480 (12,19)
BD05AV	5	.580 (14,73)
BD06AV	6	.680 (17,27)
BD07AV	7	.780 (19,81)
BD08AV	8	.880 (22,35)
BD09AV	9	.980 (24,89)
BD10AV	10	1.080 (27,43)
BD12AV	12	1.280 (32,51)

Schematic



SPST



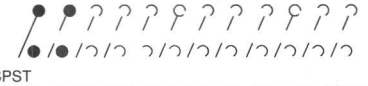


Part No. Shown: BD10AV

WITH AV2 TERMINAL STYLE

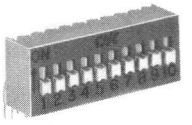
PART NO.	NO. POS.	DIM. 'A'
BD02AV2	2	.280 (7,11)
BD03AV2	3	.380 (9,65)
BD04AV2	4	.480 (12,19)
BD05AV2	5	.580 (14,73)
BD06AV2	6	.680 (17,27)
BD07AV2	7	.780 (19,81)
BD08AV2	8	.880 (22,35)
BD09AV2	9	.980 (24,89)
BD10AV2	10	1.080 (27,43)
BD12AV2	12	1.280 (32,51)

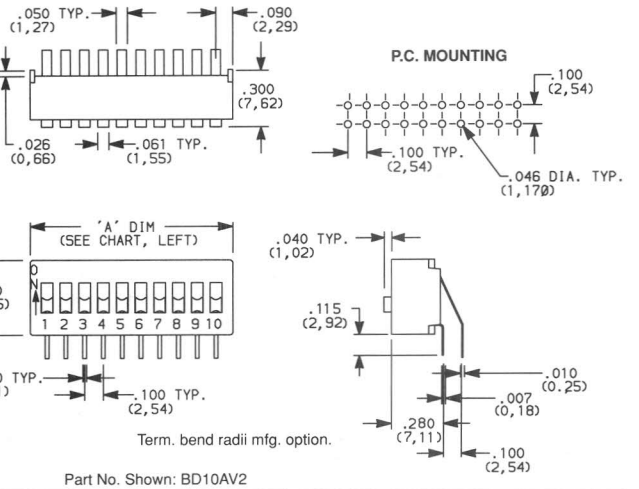
Schematic



SPST

NEW





Part No. Shown: BD10AV2

HOW TO ORDER

Complete part numbers for BD SERIES WASHABLE DIP SWITCHES are shown on pages E-3 and E-4. All switches supplied in 'OFF' position and in rigid dispensing tubes.

SPECIFICATIONS

SWITCH FUNCTION: SPST– 1 thru 12 pos. avail. (except 11 pos.).

CONTACT RATING:
Carry: 100 mA max. @ 50 V DC.
Switch: 100 mA max @ 5 V DC or 25 mA max. @ 25 V DC.

MECHANICAL & ELECTRICAL LIFE: 10,000 make-and-break cycles each circuit.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between adjacent terminals.

CAPACITANCE: 5 pF max. between adjacent terminals.

STORAGE & OPERATING TEMPERATURE: -40°C to 85°C.

SHOCK: Withstands 20 g 11 ms sawtooth waveform with no contact opening greater than 10 microseconds.

VIBRATION: No contact opening greater than 10 microseconds and no contact closure when exposed to vibration .06 in DA or 5 g, whichever is less, from 10 to 55 Hz, and 10 g from 55 to 500 Hz.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches supplied in rigid dispensing tubes. Switch pos. 1 denotes pin no. 1. All switch actuators in "OFF" position std.

MATERIALS

CASE & COVER: Glass filled polyester (PBT), flame retardant (UL 94V-0).

ACTUATOR: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

CONTACTS: WE#1 over palladium silver over nickel over phosphor bronze.

TERMINALS: Phosphor bronze, with tin-lead alloy over nickel plate.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

INSTALLATION, SOLDERING, & CLEANING

The BD Series Washable DIP Switch can be machine soldered without the use of boots, caps, tapes or special attention. A unique open base design allows solvent cleaners and water/detergent solutions to flush and clean the electrical contacts of contaminants and fluxes. For best results, follow these recommendations:

1) Wave soldering recommended at 500° F solder temp.
2) Hand solder using 30 watt small tip iron controlled at 500° F, 10 sec. max./terminal.
3) Clean flux using forced rinse, high agitation or triple bath cleaning method. Freon TMC or TF, or Methylene Chloride give excellent results. DO NOT mask or cover switch during cleaning, as switch is designed for easy solvent flush out.
4) All switch positions must be 'OFF' during cleaning.

C&K COMPONENTS, INC. 15 Riverdale Ave. Newton, MA 02158-1082 Tel: (617) 964-6400, Telex: 92-2544, Fax: (617) 527-3062

GS Series

AVAILABLE SOON

Sealed* Ultra-Miniature Slide Switches

* Process sealed – withstands soldering and cleaning processes.






- **FOUR P.C. TERMINAL STYLES – .100 IN. TERMINAL SPACING.**
- **TIN-LEAD ALLOY COATS ALL SIDES OF TERMINALS FOR JOINT INTEGRITY.**
- **SPST AND SPDT MODELS AVAILABLE.**
- **PROCESS COMPATIBLE–WITHSTANDS MACHINE SOLDERING TEMPERATURES AND PRESSURE WASH CLEANING METHODS–HIGH TEMPERATURE MATERIALS (UL 94V-0).**
- **SEALED CONSTRUCTION – INTERNAL ACTUATOR SEAL, EPOXY BASE SEAL.**

SP MODELS WITH C TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GS01MCKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic SPDT	1 ● 2 (COMM) ● 3	
GS02MCKE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic SPST	1 ● ● 3	

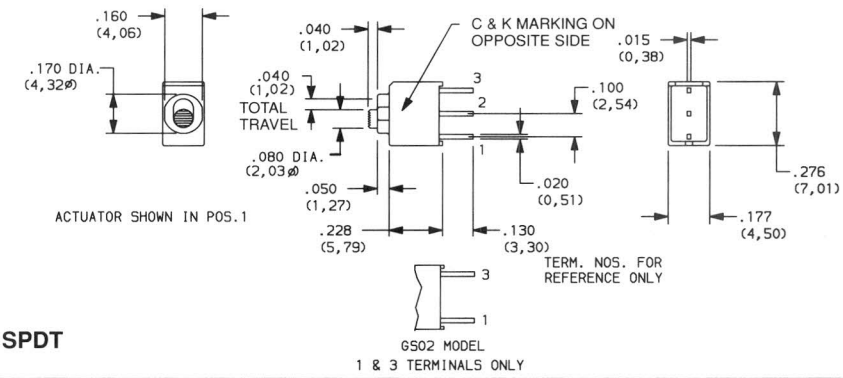


GS01
SPDT



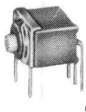
GS02
SPST

SPST and SPDT



SP MODELS WITH A TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GS01MAKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic SPDT	1 ● 2 (COMM) ● 3	
GS02MAKE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic SPST	1 ● ● 3	

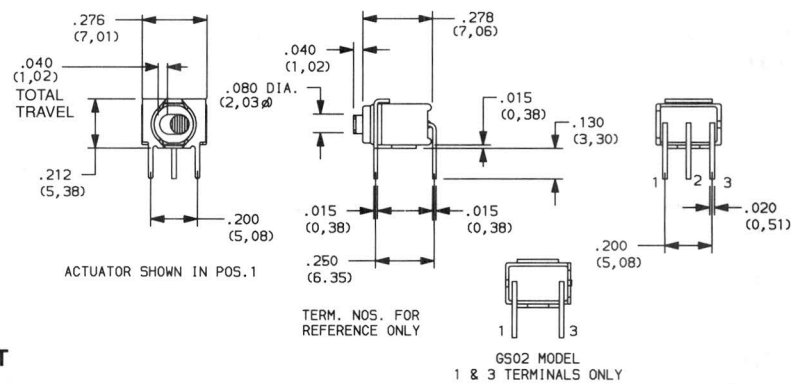


GS01
SPDT



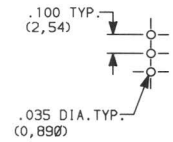
GS02
SPST

SPST and SPDT



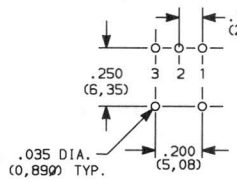
P.C. MOUNTING

C TERMINAL STYLE



GS02 - omit center hole.

A TERMINAL STYLE



GS02 - omit center hole 2.

E

GS Series

AVAILABLE SOON

Sealed* Ultra-Miniature Slide Switches

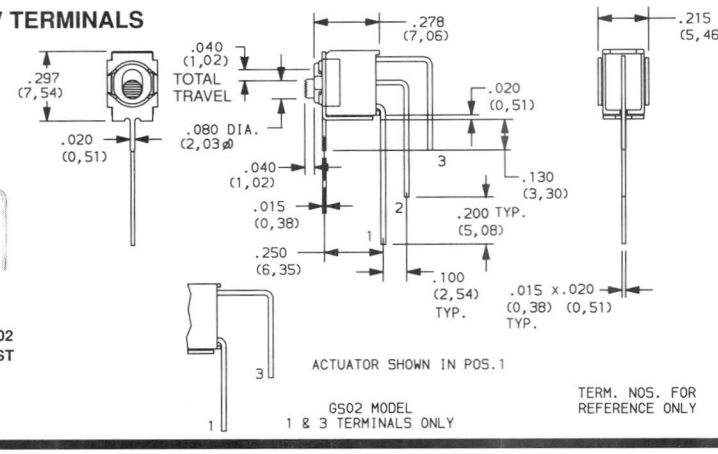
* Process sealed – withstands soldering and cleaning processes.

SP MODELS WITH AV TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GS01MAVKE	ON	ON
Conn. Terms.	2-1	2-3
Schematic SPDT	1 ● 2 (COMM) ● 3	
GS02MAVKE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic SPST	1 ● ● 3	

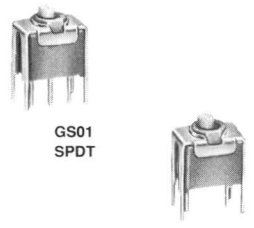


SPST and SPDT

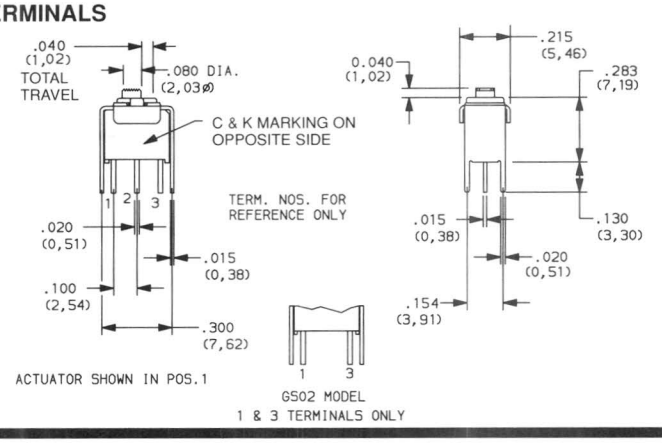


SP MODELS WITH V3 TERMINALS

PART NO.	SWITCH FUNC. POS. 1	POS. 2
GS01MV3KE	ON	ON
Conn. Terms.	2-1	2-3
Schematic SPDT	1 ● 2 (COMM) ● 3	
GS02MV3KE	OFF	ON
Conn. Terms.	OPEN	3-1
Schematic SPST	1 ● ● 3	



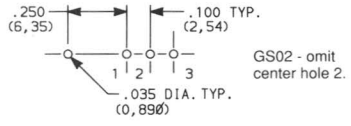
SPST and SPDT



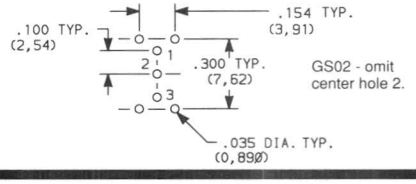
E

P.C. MOUNTING

AV TERMINAL STYLE



V3 TERMINAL STYLE



HOW TO ORDER

Complete part numbers for GS SERIES SEALED ULTRA-MINIATURE SLIDE SWITCHES are shown on pages E-5 and E-6. Additional GS Series surface mount models – see catalog section A, pages A-11 thru A-13.

SPECIFICATIONS

CONTACT RATING: 0.4 VA max. @ 20 V AC or DC max.

MECHANICAL & ELECTRICAL LIFE: 40,000 make-and-break cycles at full load.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30° C to 85° C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches available on embossed antistatic tape and reels per EIA 481A, consult factory.

MATERIALS

HOUSING & BASE: Glass filled nylon 6/6, flame retardant, heat stabilized (UL 94V-0).

ACTUATOR: Polyetherimide PEI (UL 94V-0), with standard internal seal.

SWITCH SUPPORT: Brass, tin plated.

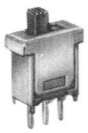
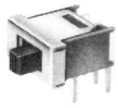
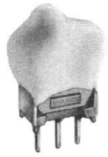
MOVABLE CONTACT: Beryllium copper with gold plate over nickel plate.

STATIONARY CONTACTS: Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

TERMINAL SEAL: Epoxy. All terminals insert molded.

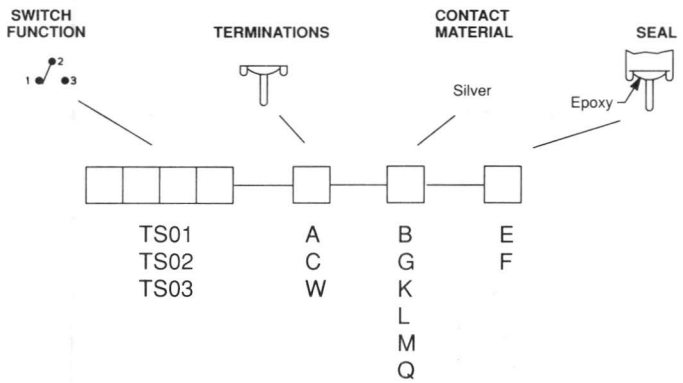
Note: Specifications and materials listed above are general specifications.
Specifications available for specific and custom switches, consult factory.

models available, see page E-8.

Easy Build-A-Switch:

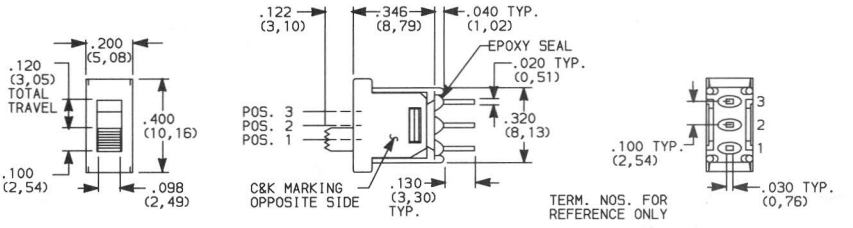
Below is a complete listing of available options for TS SERIES TINY SLIDE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switch with standard options is shown on page E-8; all available options are shown and described on pages E-8 and E-9. When buliding a part number, dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page E-9. All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods.



E

SWITCH WITH STANDARD OPTIONS





SPDT

Part No. Shown: TS01CQE

SWITCH FUNCTION

NO. POLES	MODEL* NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	TS01	ON	NONE	ON	1–2	OPEN	2–3	SPDT
	TS03	ON	OFF	ON				
	TS02	OFF	NONE	ON	OPEN	N/A	3–1	SPST

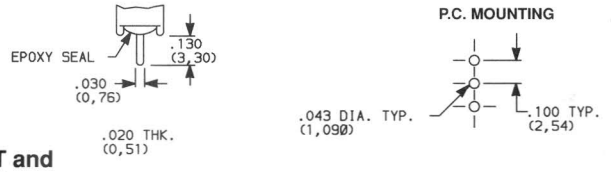
* All models UL with all options when ordered with G, L, M or Q contact material.
See AGENCY APPROVALS, page VIII.

TS02 model not available with A terminations.

E

TERMINATIONS

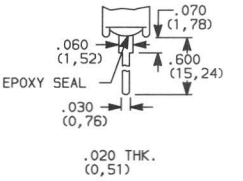
C (STD.)



SPST and SPDT

Q contact material std.

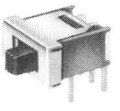
W WIRE WRAP

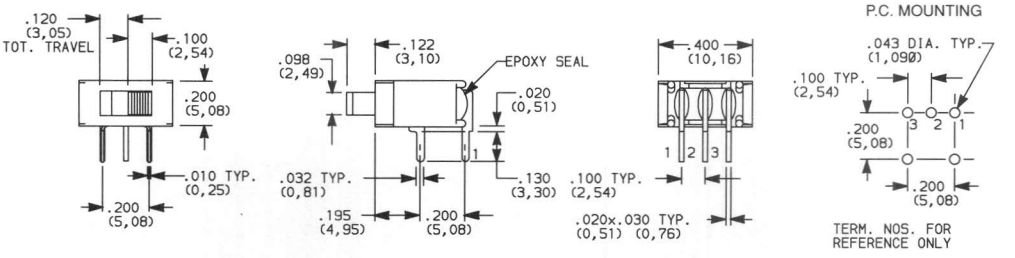


SPST and SPDT

B contact material std.

A





SPDT

Actuator shown in pos.1.
B contact mat'l std.
Not available with TS02 model.

Part No. Shown: TS01ABE

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	TS01 MODELS: 3 AMPS @120 V AC OR 28 V DC; TS02, TS03 MODELS: 1 AMP @ 120 V AC OR 28 V DC
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	TS01 MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 3 AMPS @120 V AC OR 28 V DC; TS02, TS03 MODELS: 0.4 VA MAX @20 V AC OR DC MAX. OR 1 AMP @ 120 V AC OR 28 V DC
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

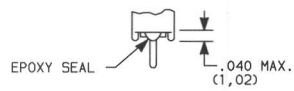
[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

B contact material std. with A and W terminations.
Q contact material std. with C terminations.

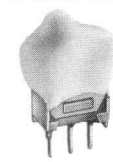
All models with all options when ordered with G, L, M or Q contact material.
See pages E-8 and VIII.

SEAL

E (STD.)



F SPLASHPROOF SILICONE RUBBER SEAL AND EPOXY TERMINAL SEAL



Silicone rubber seal peels off easily after installation. Epoxy terminal seal std.

Not available with A terminations.

E

HOW TO ORDER

All available TS SERIES TINY SLIDE SWITCH options are listed on page E-7, and are described on pages E-8 and E-9. Switch with standard options is shown on page E-7. When selecting options and building a part number, dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods. models available, see page E-8.

SPECIFICATIONS

CONTACT RATING:
TS01 MODELS: 3 AMPS @120 V AC or 28 V DC.
TS02, TS03 MODELS: 1 AMP @ 120 V AC or 28 V DC (Q contact mat'l).

ELECTRICAL LIFE: TS01 MODELS: 60,000 make-and-break cycles at full load.
TS02, TS03 MODELS: 30,000 cycles.

CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 85°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

CASE: Glass filled nylon 6/6, flame retardant, heat stabilized, or diallyl phthalate (DAP), (UL 94V-0).

ACTUATOR: Nylon, black.

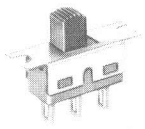
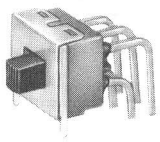
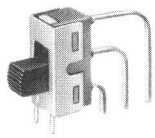
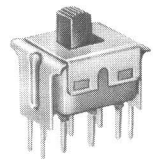
HOUSING: Stainless steel. Models with A termination options: stainless steel, nickel plated.

END CONTACTS: Coin silver, silver plated (Q contact mat'l).

CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l).

TERMINAL SEAL: Epoxy.

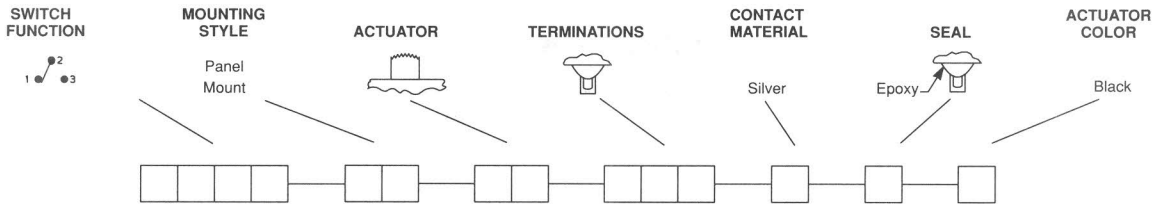
Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

models available, see page E-11.

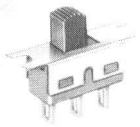
Easy Build-A-Switch:

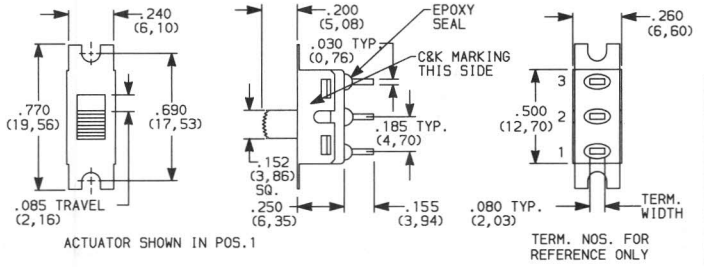
Below is a complete listing of available options for 1000 SERIES MINIATURE SLIDE SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page E-11; all available options are shown and described on pages E-11 thru E-16. When building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page E-16. All models have epoxy terminal seal and are compatible with 'bottom-wash' PC board cleaning methods.



1101	M1	S1	A	B	E	1
1103	M2	S2	AV1	G	I	2
1108		S3	AV2	K		3
1201		S4	AV4	L		4
1203		S5	AV5	M		5
		S6	AW	Q		6
		T3	AW1			7
			AW3			8
			AW4			9
			AW5			
			C			
			V3			
			V4			
			W			
			W1			
			W3			
			W4			
			W5			
			Z			
			Z3			

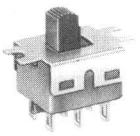
SWITCHES WITH STANDARD OPTIONS

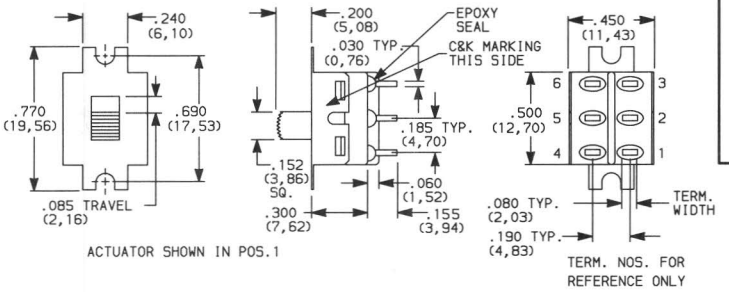




SPDT

Part No. Shown: 1101M1S3ZQE2

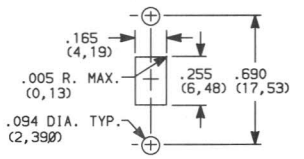




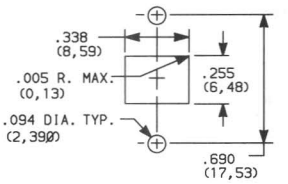
DPDT

Part No. Shown: 1201M1S3ZQE2

PANEL MOUNTING



All actuators except T3.



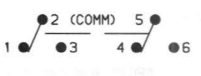
For T3 actuator only.

SWITCH FUNCTION



NO. POLES	MODEL* NO.	SWITCH FUNCTION POS. 1	SWITCH FUNCTION POS. 2	SWITCH FUNCTION POS. 3	CONNECTED TERMINALS POS. 1	CONNECTED TERMINALS POS. 2	CONNECTED TERMINALS POS. 3	SCHEMATIC
SP	1101	ON	NONE	ON	1-2	OPEN	2-3	SPDT
	1103	ON	OFF	ON				
	1108	MOM.	NONE	ON				
DP	1201	ON	NONE	ON	2-1,5-4	OPEN	2-3,5-6	DPDT
	1203	ON	OFF	ON				





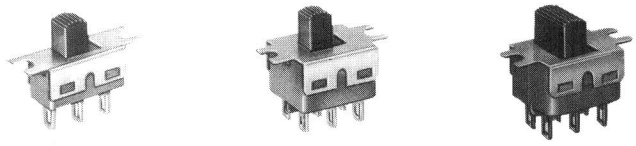
MOM. = MOMENTARY

* All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

E

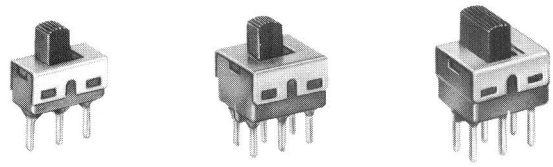
MOUNTING STYLE

M1 (STD.) PANEL MOUNT



Available with Z, C, Z3, W-W5 terminations only. No mounting hardware supplied.

M2 P.C. MOUNT

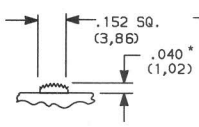


Available with C, W-W5, A, AW-AW5, AV1-AV5, V3-V4 terminations only.

ACTUATOR

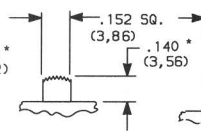
ACTUATOR COLOR

S1



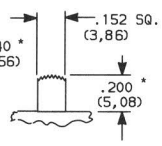
120X models only.

S2

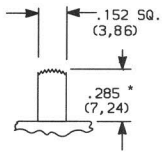


110X models only.

S3 (std.)

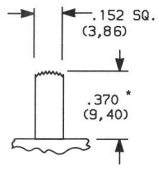


S4

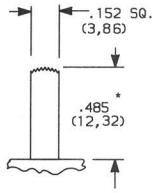


110X models only.

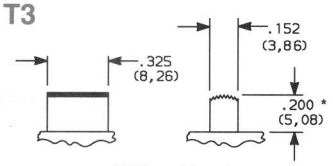
S5



S6



T3



120X models only.

* Subtract .014 (0,36) from actuator height – all models with A, AW-AW5, AV1-AV5, V3-V4 terminations.

ACTUATOR COLOR

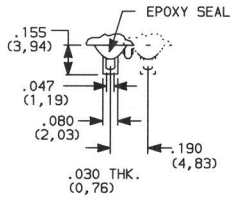
OPTION CODE	ACTUATOR COLORS
1	WHITE
2	BLACK (std.)
3	RED
4	ORANGE
5	YELLOW
6	GREEN
7	BLUE
8	BROWN
9	GRAY

Select actuator color from chart. Place option code in appropriate box of ordering format.

E

TERMINATIONS

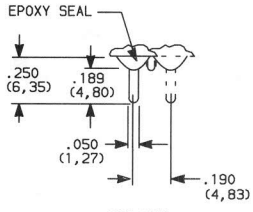
Z (STD.)

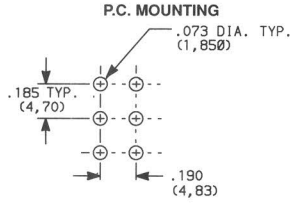


SPDT and **DPDT**

Q contact material std.
Not avail. with K, L, or M contact material.

C

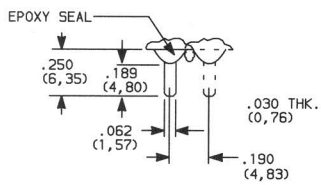




SPDT and **DPDT**

Q contact material std.

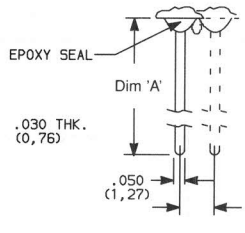
Z3 QUICK CONNECT



SPDT and **DPDT**

Q contact material std.
Mating quick connector available; order part no. 530100000.

W-W1-W3-W4-W5 WIRE WRAP



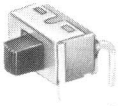
Option	Dim 'A'
W	.750 (19,05)
W1	.964 (24,49)
W3	.425 (10,80)
W4	1.062 (26,97)
W5	1.305 (33,15)

SPDT and **DPDT**

B contact material std.

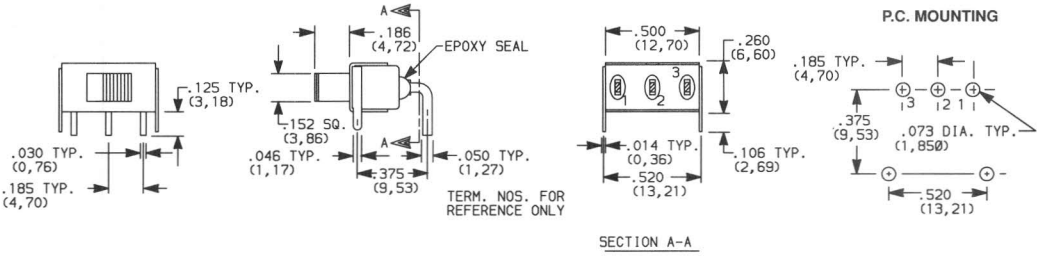
TERMINATIONS

A



A

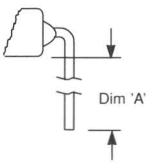
SPDT



Part No. Shown: 1101M2S3ABE2

AW-AW1-AW3-AW4-AW5 EXTENDED

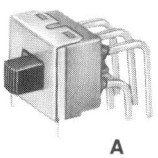
NEW



Option	Dim 'A'
AW	.50 (12,7)
AW1	.71 (18,0)
AW3	.20 (5,1)
AW4	.81 (20,6)
AW5	1.06 (26,9)

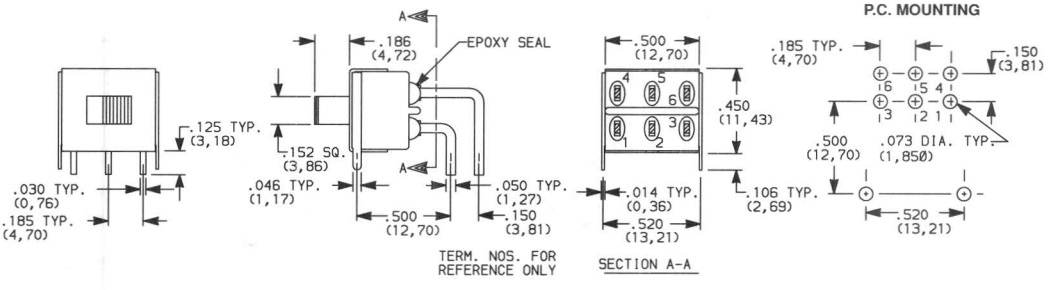
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with M1 mtg. style, I seal option.

A



A

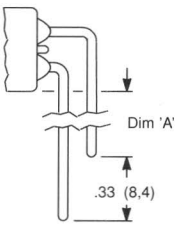
DPDT



Part No. Shown: 1201M2S3ABE2

AW1-AW4-AW5 EXTENDED

NEW



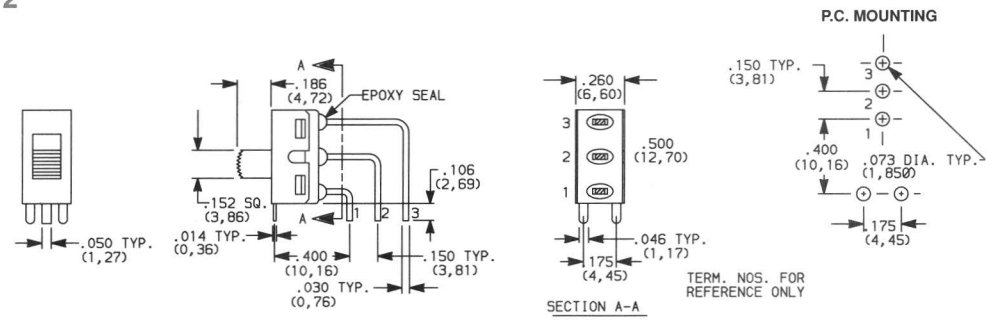
Option	Dim 'A'
AW1	.35 (8,9)
AW4	.46 (11,7)
AW5	.70 (17,8)

Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with M1 mtg. style, I seal option.

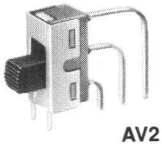
E

TERMINATIONS

AV2



Part No. Shown: 1101M2S3AV2BE2

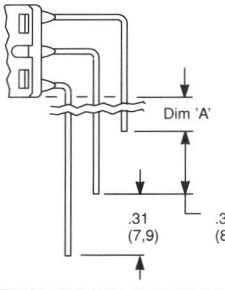


AV2

SPDT

AV1-AV4-AV5 EXTENDED

NEW

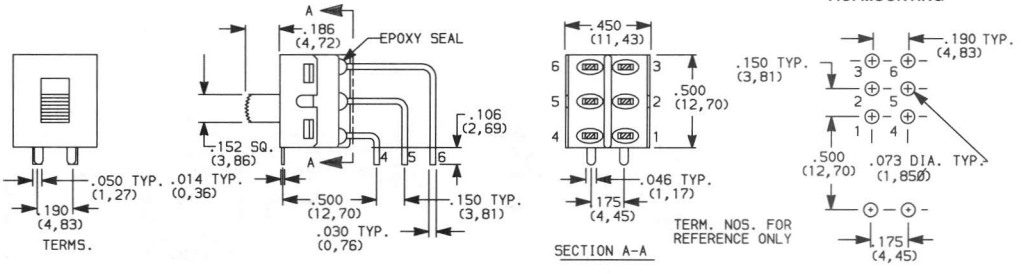


Option	Dim 'A'
AV1	.13 (3,3)
AV4	.22 (5,6)
AV5	.46 (11,7)

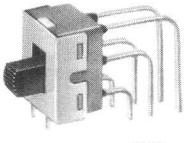
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with M1 mtg. style, I seal option.

E

AV2



Part No. Shown: 1201M2S3AV2BE2

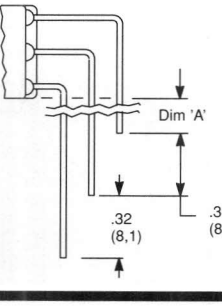


AV2

DPDT

AV4-AV5 EXTENDED

NEW

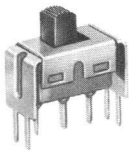


Option	Dim 'A'
AV4	.16 (4,1)
AV5	.40 (10,2)

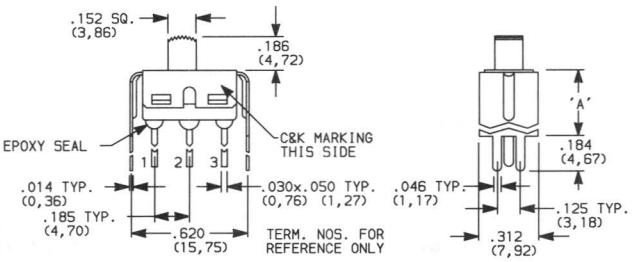
Term. bend radii and lead-in mfg. option.
Actuator shown in pos.1.
B contact material std.
Not available with M1 mtg. style, I seal option.

TERMINATIONS

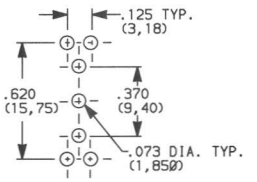
V3-V4



SPDT



P.C.MOUNTING

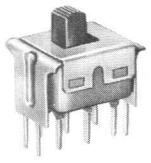


Option	Dim 'A'
V3	.350 (8,89)
V4	.525 (13,34)

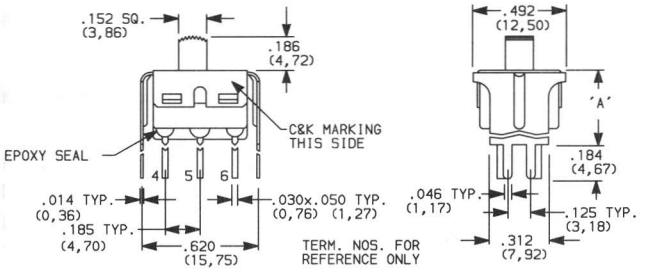
Actuator shown in pos.1.
B contact material std.
Not available with M1 mtg. style, I seal option.

Part No. Shown: 1101M2S3V_BE2

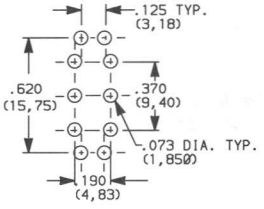
V3-V4



DPDT



P.C.MOUNTING



Option	Dim 'A'
V3	.400 (10,16)
V4	.575 (14,61)

Actuator shown in pos.1.
B contact material std.
Not available with M1 mtg. style, I seal option.

Part No. Shown: 1201M2S3V_BE2

E

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
B	GOLD [1]	GOLD [1]	LOW LEVEL/ DRY CIRCUIT	0.4 VA MAX. @20 V AC OR DC MAX.
K		TIN-LEAD [6]		
Q	SILVER [4,5]	SILVER [5]	POWER	6 AMPS @120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
M		TIN-LEAD [6]		
G	GOLD OVER SILVER [2,3]	GOLD [3]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR 6 AMPS @ 120 V AC OR 28 V DC; 3 AMPS @ 250 V AC.
L		TIN-LEAD [6]		

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] CONTACTS & TERMINALS: Copper alloy, with gold plate over nickel plate.
[2] END CONTACTS: Coin silver, with gold plate over nickel plate.
[3] CENTER CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate.
[4] END CONTACTS: Coin silver, silver plated.
[5] CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated.
[6] TERMINALS: Copper alloy, with tin-lead alloy over nickel plate.

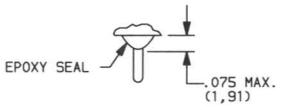
B contact material std. with all terminations except Z, C, Z3.
Q contact material std. with Z, C, Z3 terminations.

K, L, M contact materials not available with Z terminations

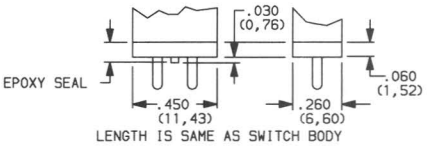
All models with all options when ordered with G, L, M or Q contact material. See AGENCY APPROVALS, page VIII.

SEAL

E (STD.)



I



Available with Z, C, Z3, W-W5 terminations only.

HOW TO ORDER

All available 1000 SERIES SLIDE SWITCH options are listed on page E-10, and described on pages E-11 thru E-16. Switches with standard options are shown on page E-11. When selecting options and building a part number, some ordering format boxes may not be filled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models have epoxy terminal seal, and are compatible with 'bottom-wash' PC board cleaning methods. UL CSA models available, see page E-11. No mounting hardware is supplied.

SPECIFICATIONS

CONTACT RATING: 6 AMPS @120 V AC or 28 V DC.
3 AMPS @ 250 V AC (Q contact mat'l).

ELECTRICAL LIFE: 100,000 make-and-break cycles at full load on models with B or K contact material; 40,000 cycles on models with G, Q, L or M contact material.

CONTACT RESISTANCE: Below 10 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 1000 V RMS min. @ sea level.

OPERATING TEMPERATURE: -30°C to 65°C.

SOLDERABILITY: Per mil std 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

CASE: Diallyl phthalate (DAP), (UL 94V-0).

ACTUATOR: Nylon, black., std.

HOUSING: Stainless steel.

SWITCH SUPPORT: Brass or steel, tin plated.

END CONTACTS: Coin silver, silver plated (Q contact mat'l).

CENTER CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l).

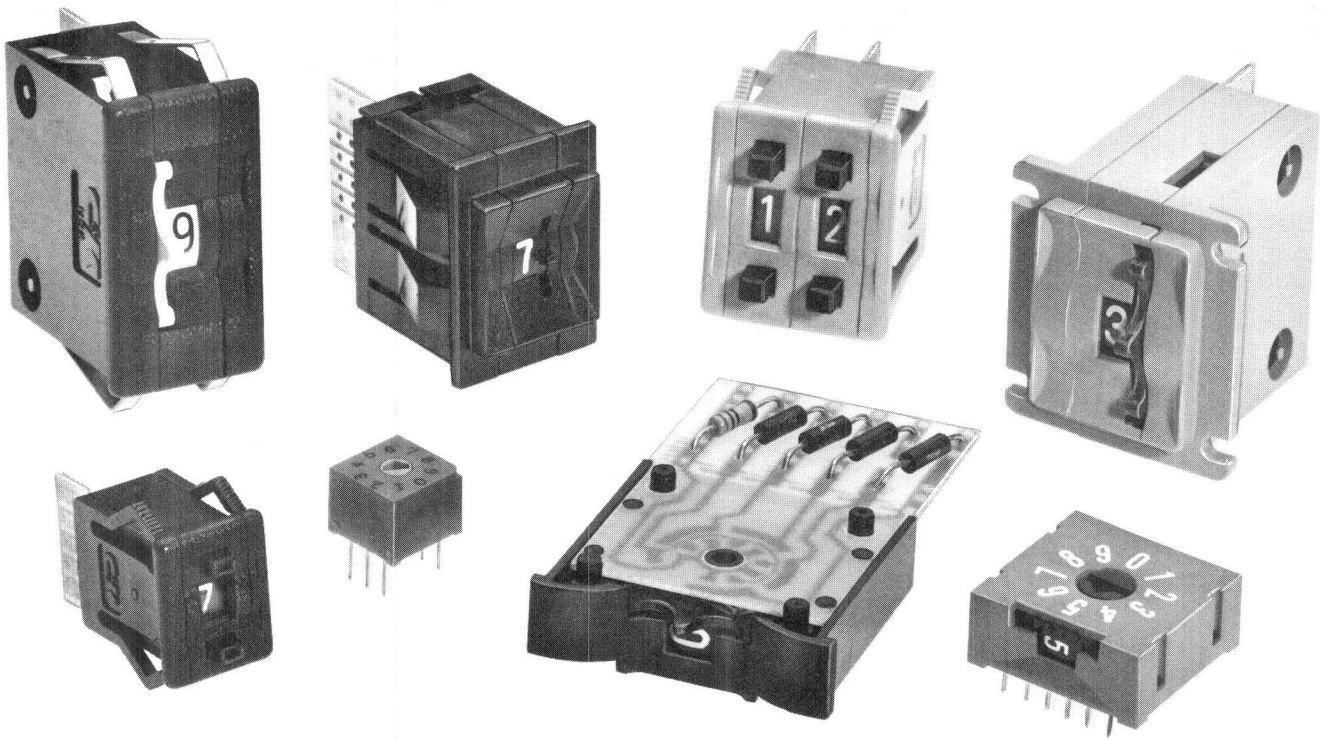
TERMINAL SEAL: Epoxy.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

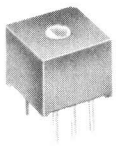
E

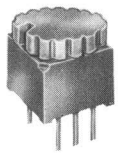
SECTION F

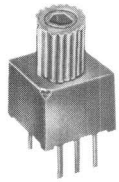
CODED SWITCHES



3D Series	Sealed DIP Coded Rotary Switches	F-2 thru F-4
3M Series	Minithumbwheel Switches	F-5 thru F-7
3U Series	Tiny Pushwheel Switches	F-8 thru F-12
3P Series	Miniature Pushwheel Switches	F-13 thru F-17
S2 Series	Subminiature Thumbwheel Switches	F-18 thru F-23
SF/SR Series	Thumbwheel Switches	F-24 thru F-34
3 Series	Thumbwheel Switches	F-35 thru F-46

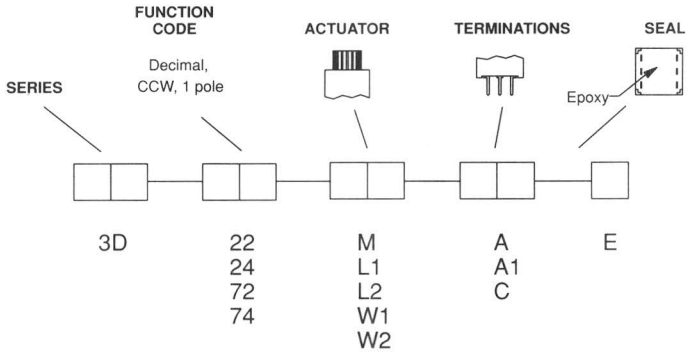






Easy Build-A-Switch:

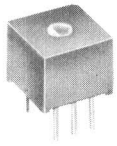
Below is a complete listing of available options for 3D SERIES SEALED DIP CODED ROTARY SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages F-3 and F-4. When building a part number, some ordering format boxes may be unfilled. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-4. All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. Additional 3D Series surface mount models – see catalog pages A-19 thru A-21.

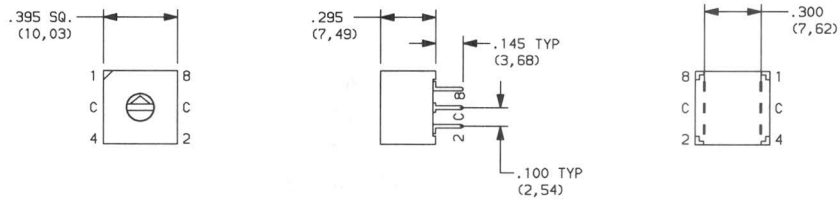


F

SERIES

3D





Part No. Shown: 3D__MCE

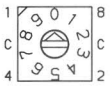
Sealed* DIP Coded Rotary Switches

* Process sealed – withstands soldering and cleaning processes.

FUNCTION CODES



22 BINARY CODED DECIMAL, 1 POLE, 10 POSITION



WHEEL	COMM. (C) CONN. TO TERM. IND. 1	2	4	8
0				
1	●			
2		●		
3	●	●		
4			●	
5	●		●	
6		●	●	
7	●	●	●	
8				●
9	●			●

24 COMPLEMENT OF BCD, 1 POLE, 10 POSITION

WHEEL	COMM. (C) CONN. TO TERM. IND. $\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$
0	●	●	●	●
1		●	●	●
2	●		●	●
3			●	●
4	●	●		●
5		●		●
6	●			●
7				●
8	●	●	●	
9		●	●	

Clockwise rotation when viewed from top.

72 BINARY CODED HEXADECIMAL, 1 POLE, 16 POSITION



WHEEL	SIGNALS CONN. TO COMMON SIG. C 1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
A		●		●	●
B	●	●		●	●
C			●	●	●
D	●		●	●	●
E		●	●	●	●
F	●	●	●	●	●

74 COMPLEMENT OF BINARY CODED HEXADECIMAL, 1 POLE, 16 POSITION

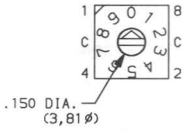
WHEEL	SIGNALS CONN. TO COMMON SIG. C $\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0	●	●	●	●	●
1		●	●	●	●
2	●		●	●	●
3			●	●	●
4	●	●		●	●
5		●		●	●
6	●			●	●
7				●	●
8	●	●	●		●
9		●	●		●
A	●		●		●
B			●		●
C	●	●			●
D		●			●
E	●				●
F					●

Clockwise rotation when viewed from top.

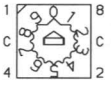
ACTUATOR

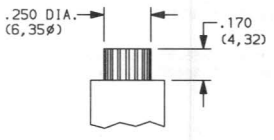


M (STD.)

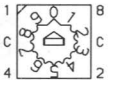


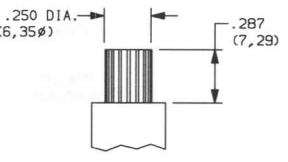
L1 SHAFT



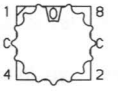


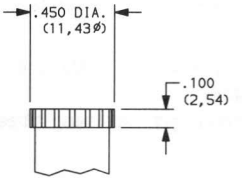
L2 SHAFT



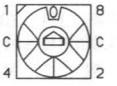


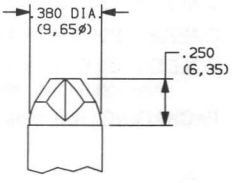
W1 WHEEL





W2 KNOB



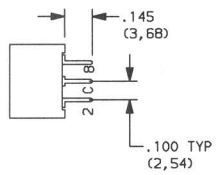


NOTE: Shaft lengths of .150 (3,81) – .400 (10,16) possible, consult factory.

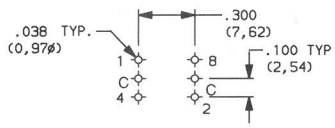
F

TERMINATIONS

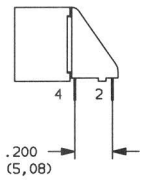
C (STD.)



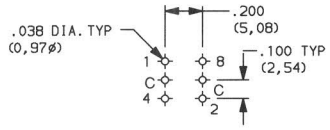
P.C. MOUNTING



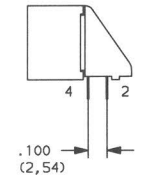
A



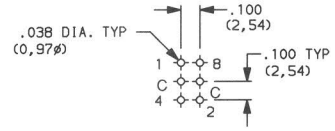
P.C. MOUNTING



A1

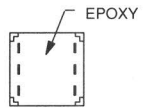


P.C. MOUNTING



SEAL

E (STD.)



HOW TO ORDER

All available 3D SERIES SEALED DIP CODED ROTARY SWITCH options are listed on page F-2, and are described on pages F-2 and F-4. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

All models are process sealed to withstand machine soldering temperatures and pressure wash cleaning methods. Additional 3D Series surface mount models – see catalog section A, pages A-19 thru A-21.

F

SPECIFICATIONS

CONTACT RATING: 100 mA max. @5 V DC or 25 mA max. @ 25 V DC.

ELECTRICAL LIFE: 2000 make-and-break cycles at full load, for a total of 64,000 detent operations.

CONTACT RESISTANCE: Below 50 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level.

OPERATING TEMPERATURE: -40°C to 85°C.

SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

PACKAGING: Switches supplied in rigid dispensing tubes.

MATERIALS

HOUSING: PEI (UL 94V-0)

BASE: PET (UL 94V-0).

ROTOR & ACTUATOR: PES, with standard internal o-ring seal (UL 94V-0).

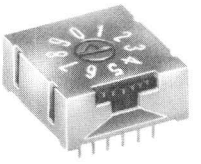
SHAFT AND WHEEL: Nylon 6/6, (UL 94V-0).

CONTACTS: Copper alloy, with gold plate over nickel plate.

TERMINALS: Copper alloy, with tin-lead alloy over nickel plate. All terminals insert molded.

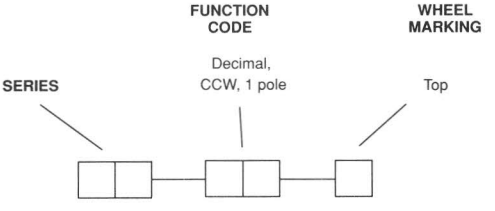
TERMINAL SEAL: Epoxy.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.



Easy Build-A-Switch:

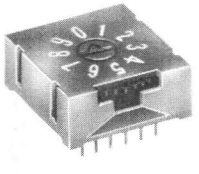
Below is a complete listing of available options for 3M SERIES MINITHUMBWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages F-5 and F-6. When building a part number, dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-7.

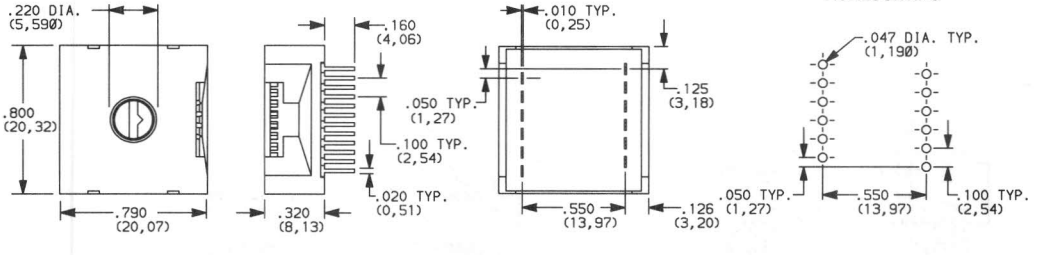


F

SERIES □□-□□-□

3M





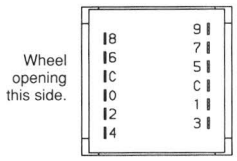
Part No. Shown: 3MXX0

FUNCTION CODE

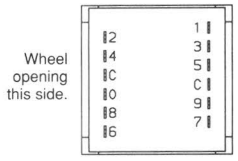
11 DECIMAL, CCW, 1 POLE
12 DECIMAL, CW, 1 POLE

WHEEL	COMMON (C) CONNECTED TO TERMINAL INDICATED								
	0	1	2	3	4	5	6	7	8	9
0	●									
1		●								
2			●							
3				●						
4					●					
5						●				
6							●			
7								●		
8									●	
9										●

FUNCTION CODE 11



FUNCTION CODE 12

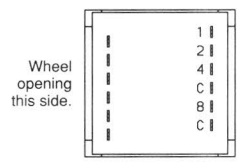


CCW: Counter clockwise rotation (viewed from top).
CW: Clockwise rotation (viewed from top).

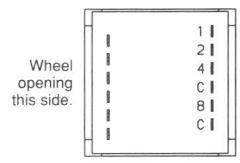
21 BCD, CCW, 1 POLE
22 BCD, CW, 1 POLE

WHEEL	COMM. (C) CONN. TO TERM. IND.			
	1	2	4	8
0				
1	●			
2		●		
3	●	●		
4			●	
5	●		●	
6		●	●	
7	●	●	●	
8				●
9	●			●

FUNCTION CODE 21



FUNCTION CODE 22

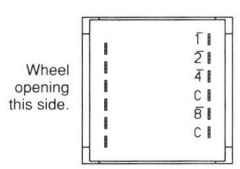


CCW: Counter clockwise rotation (viewed from top).
CW: Clockwise rotation (viewed from top).
All unused terminals should not be connected.

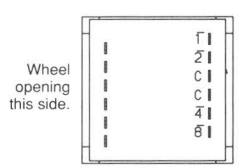
23 COMPLEMENT OF BCD, CCW, 1 POLE
24 COMPLEMENT OF BCD, CW, 1 POLE

WHEEL	COMM. (C) CONN. TO TERM. IND.			
	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$
0	●	●	●	●
1		●	●	●
2	●		●	●
3			●	●
4	●	●		●
5		●		●
6	●			●
7				●
8	●	●	●	
9		●	●	

FUNCTION CODE 23



FUNCTION CODE 24

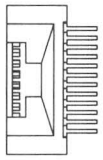


CCW: Counter clockwise rotation (viewed from top).
CW: Clockwise rotation (viewed from top).
All unused terminals should not be connected.

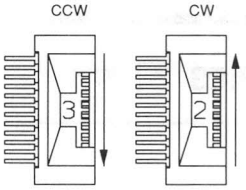
F

WHEEL MARKING

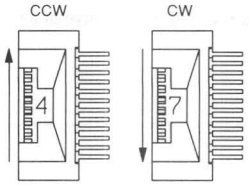
0 NO WHEEL MARKING (STD.)



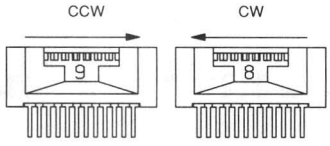
1



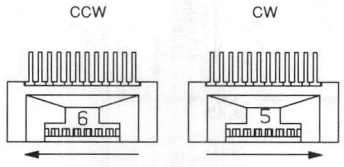
2



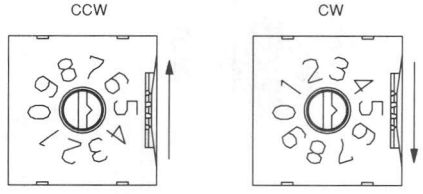
3



4



TOP MARKINGS – ALL SWITCHES



HOW TO ORDER

All available 3M SERIES MINITHUMBWHEEL SWITCH options are listed on page F-5, and are described on pages F-5 and F-6. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only.

SPECIFICATIONS

CONTACT RATING:
CARRY: 1 AMP continuous @28 V DC.
SWITCH: 100 mA max. @28 V DC.

ELECTRICAL LIFE: 10^5 detent operations @ 25°C.

CONTACT RESISTANCE: Below 100 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^8 ohms min. (dry).

DIELECTRIC STRENGTH: 250 V RMS min. @ sea level.

OPERATING TEMPERATURE: -10°C to 65°C.

MATERIALS

HOUSING: Glass filled polyester (UL 94V-0).

BASE: Glass filled nylon (UL 94V-0).

THUMBWHEEL: Glass filled polyester (UL 94V-0).

ROTOR CONTACTS: Hard gold over nickel over copper on epoxy fiberglass.

STATOR CONTACTS: Copper alloy, with gold over nickel.

TERMINALS: Solder clad over copper alloy. All terminals insert molded. All terminals present regardless of function.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

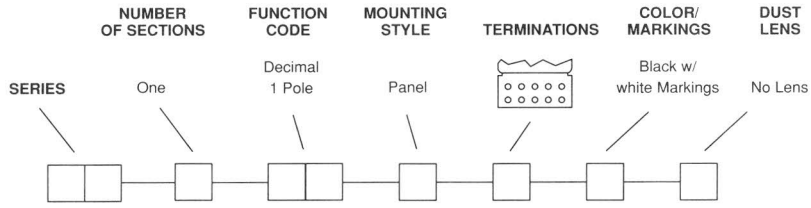
F





Easy Build-A-Switch:

Below is a complete listing of available options for 3U SERIES TINY PUSHWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages F-8 thru F-11. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-11. Use CONFIGURATION FORM, page F-12, for special instructions. Hardware is available separately, see catalog section H.



Special switch no. assigned by C&K.



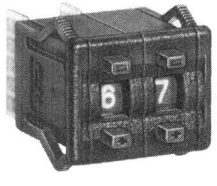
Configuration form required, see page F-12.

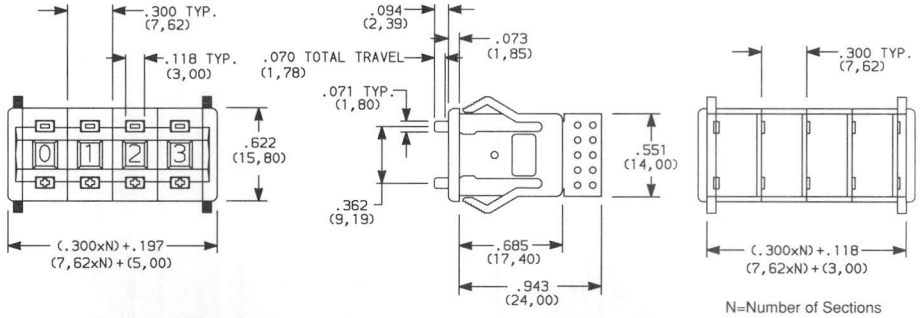
SERIES	NUMBER OF SECTIONS	FUNCTION CODE	MOUNTING STYLE	TERMINATIONS	COLOR/ MARKINGS	DUST LENS
3U	0 1 2 3 4 5 6 7 8 9	11 12 21 61 65 91 98 99	0	0 1 3 9 A L M P	0 1 9	0 2

F

SERIES

3U





N=Number of Sections

Part No. Shown: 3U4110000

NUMBER OF SECTIONS

0 Switch section only, no endplates.

1-8 Number of switch sections in assembly, includes endplates.

9 More than 8 switch sections, specify on CONFIGURATION FORM, page F-12 and consult factory.

Note: Endplates and blank sections available separately, see catalog section H.

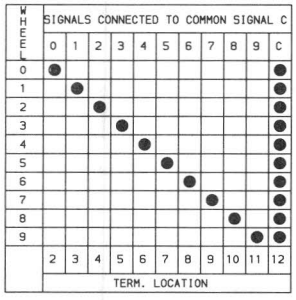
FUNCTION CODE

For terminal location diagrams, see page F-10.

11 DECIMAL – 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

L, P

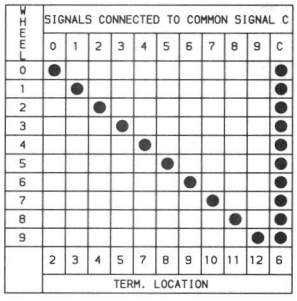


See fig. 3, page F-10.

12 DECIMAL – 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

L, P

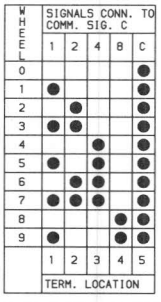


See fig. 3, page F-10.

21 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P



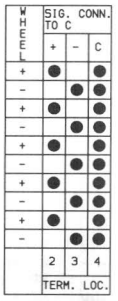
See figs. 2 & 3, page F-10.

61 SPDT REPEATING; 10 POSITION

PLUS (+) AND MINUS (–) ALTERNATING

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P



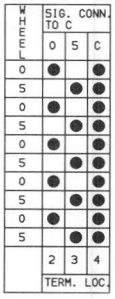
See figs. 2 & 3, page F-10.

65 SPDT REPEATING; 10 POSITION

ZERO (0) AND FIVE (5) ALTERNATING

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P



See figs. 2 & 3, page F-10.

91 BLANK SECTION (INACTIVE)

AVAILABLE TERMINATIONS

9

98 IC ROM, 32 WORD x 8 BIT, USER PROGRAMMABLE; ADDRESS 0 THRU 9

AVAILABLE TERMINATIONS

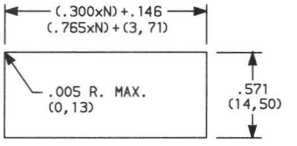
L, P

99 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-12 AND CONSULT FACTORY.

F

MOUNTING STYLE

0 SNAP-IN FRONT MOUNTING



RECOMMENDED PANEL THICKNESS

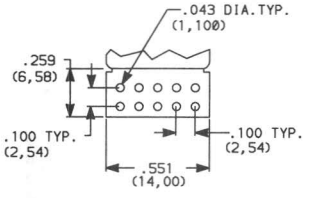
.039 – .156
(0,99) – (3,95)

N = Number of sections.

TERMINATIONS

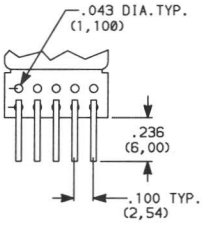
Note: All terminal holes shown may not be present for all function codes, consult factory.

0 (STD.)



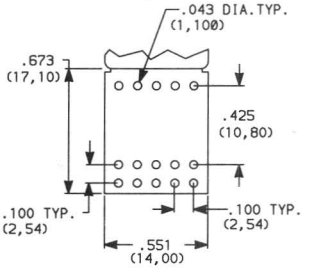
P.C. BOARD 1/32" (0,79) THK.

3 TYPE 0 W/SOLDER PINS



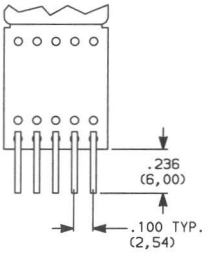
See fig. 1, below.

1 EXTENDED BOARD W/PROVISION FOR COMPONENTS



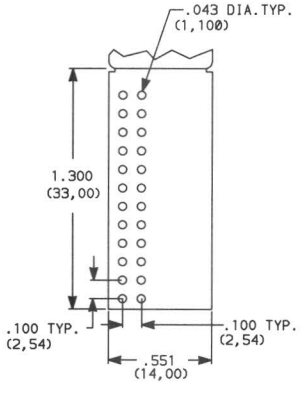
P.C. BOARD 1/32" (0,79) THK.
Signal traces cut except for common(s).

A TYPE 1 W/SOLDER PINS



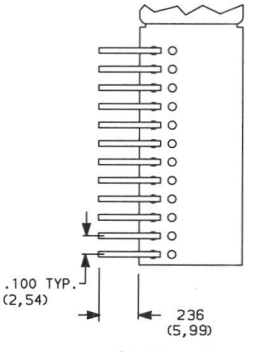
See fig. 1, below.

L RIGHT ANGLE BOARD



P.C. BOARD 1/32" (0,79) THK.

P TYPE L W/SOLDER PINS



See fig. 1, below.
Unsuitable for panel mounting.

M SPECIAL TERMINATION

CONSULT FACTORY

9 ANY COMBINATION OF TERMINATION CONFIGURATIONS.

SPECIFY ON CONFIGURATION FORM, PAGE F-12, AND CONSULT FACTORY.

SOLDER PINS

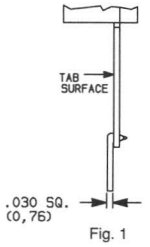


Fig. 1

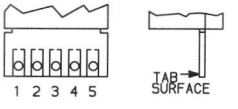


Fig. 2

TERMINAL LOCATION NUMBERS

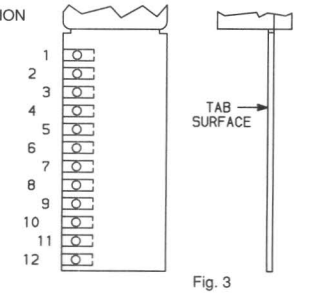


Fig. 3

See function codes, page F-9 for signal locations.

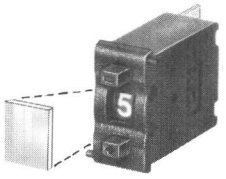
COLOR / MARKING

0 (STD.) Matte black housing; Gloss black wheel with white characters; Black pushbuttons.

1 Matte gray housing; Gloss black wheel with white characters; Black pushbuttons.

9 Special colors, markings for housing or wheel, specify on CONFIGURATION FORM, page F-12, and consult factory.

DUST LENS



0 (STD.) No Lens.

2 Dust Lens (protects character face of the wheel from abrasion and dust).

HOW TO ORDER

All available 3U SERIES TINY PUSHWHEEL SWITCH options are listed on page F-8, and are described on pages F-8 thru F-11. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F-12, for special instructions.

Endplates and blank sections are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
CARRY: 1 AMP continuous.
SWITCH: 100 mA max.

OPERATING VOLTAGE: 50 mV to 28 V DC.

ELECTRICAL LIFE: 100,000 actuations through revolutions of 360^{o} thru a total of 1,000,000 detents.

CONTACT RESISTANCE: Below 300 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^{9} ohms min. (dry).

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between common terminal and any output.

OPERATING TEMPERATURE: -10^{o}C to 65^{o}C.

MATERIALS

SWITCH BODY: ABS plastic.

PUSHWHEEL: Nylon 6/6.

PUSHBUTTON: Delrin.

ROTOR CONTACTS: Gold over nickel over copper alloy.

STATOR CONTACTS: Hard gold over nickel over 2 oz. copper on epoxy fiberglass.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

F

Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO. 3 U _ _ _ _ _ _ _

C&K PART NUMBER _ _ _ _ _

C&K PART NUMBER

COMPANY NAME _____

ADDRESS _____ TEL.# _____

CUSTOMER CONTACT _____ DATE _____

ORIGINATED BY _____ SALES REP. _____

REVISION:

DETAILS:

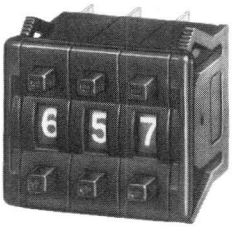
PUSHWHEEL SECTIONS	NO. OF SEC.	FUNCTION CODE – TERMINATIONS – COLOR/MARKINGS – DUST LENS ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION CODES INCLUDE BLANK SECTIONS (SEE CATALOG PAGE F-9).	DESCRIBE IN APPROPRIATE ROW
1	1	3 U – – –	
2	2	3 U – – –	
3	3	3 U – – –	
4	4	3 U – – –	
5	5	3 U – – –	
6	6	3 U – – –	
7	7	3 U – – –	
8	8	3 U – – –	
9	9	3 U – – –	
0	10	3 U – – –	
1	11	3 U – – –	
2	12	3 U – – –	
3	13	3 U – – –	
4	14	3 U – – –	
5	15	3 U – – –	
6	16	3 U – – –	

FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

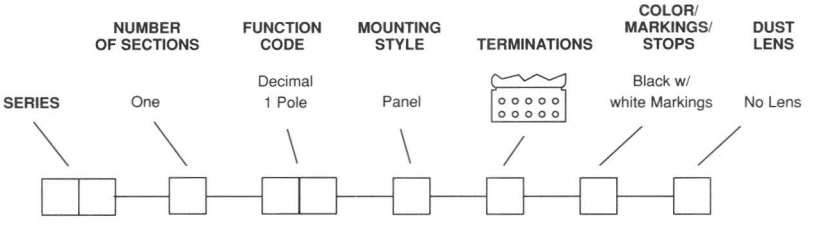
SHEET ____ OF ____





Easy Build-A-Switch:

Below is a complete listing of available options for 3P SERIES MINIATURE PUSHWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages F-13 thru F-16. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-16. Use CONFIGURATION FORM, page F-17, for special instructions. Hardware is available separately, see catalog section H.



Special switch no. assigned by C&K.

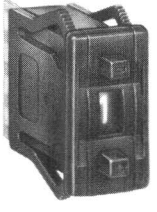
Configuration form required, see page F-17.

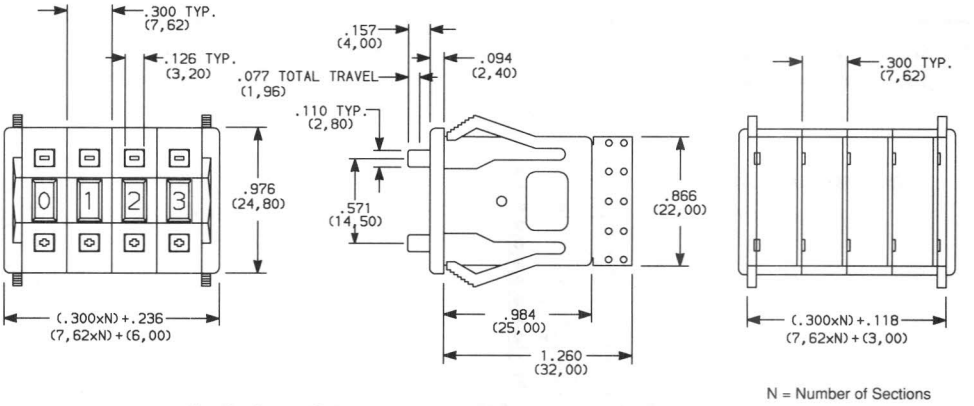
3P	0	11	0	0	0	0
	1	12	3	1	1	2
	2	21		3	9	
	3	23		9		
	4	61		A		
	5	65		L		
	6	91		M		
	7	98		P		
	8	99		W		
	9			Y		

F

SERIES

3P





N = Number of Sections

Part No. Shown: 3P4210000

NUMBER OF SECTIONS

0 Switch section only, no endplates.

1-8 Number of switch sections in assembly, includes endplates.

9 More than 8 switch sections, specify on CONFIGURATION FORM, page F-17 and consult factory.

Note: Endplates, spacers and blank sections available separately, see catalog section H.

FUNCTION CODE

For terminal location diagrams, see page F-16.

11 DECIMAL – 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

L, P, W, Y

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL C									
	0	1	2	3	4	5	6	7	8	9	C
0	●										●
1		●									●
2			●								●
3				●							●
4					●						●
5						●					●
6							●				●
7								●			●
8									●		●
9										●	●
	2	3	4	5	6	7	8	9	10	11	12
	TERM. LOCATION										

See fig. 3, page F-15.

12 DECIMAL – 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

L, P, W, Y

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL C									
	0	1	2	3	4	5	6	7	8	9	C
0	●										●
1		●									●
2			●								●
3				●							●
4					●						●
5						●					●
6							●				●
7								●			●
8									●		●
9										●	●
	2	3	4	5	7	8	9	10	11	12	6
	TERM. LOCATION										

See fig. 3, page F-15.

21 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P, W, Y

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	1	3	5	7	9
	TERM. LOCATION				

See figs. 2 & 3, page F-15.

23 COMPLEMENT OF BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P, W, Y

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0	●	●	●	●	●
1		●	●	●	●
2	●		●	●	●
3			●	●	●
4	●	●		●	●
5		●		●	●
6	●			●	●
7				●	●
8	●	●	●		●
9		●	●		●
	1	7	9	3	5
	TERM. LOCATION				

See figs. 2 & 3, page F-10.

61 SPDT REPEATING; 10 POSITION PLUS (+) AND MINUS (–) ALTERNATING

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P, W, Y

WHEEL	SIG. CONN. TO C		
	+	–	C
+	●		●
–		●	●
+	●		●
–		●	●
+	●		●
–		●	●
+	●		●
–		●	●
+	●		●
–		●	●
	3	5	7
	TERM. LOC.		

See figs. 2 & 3, page F-15.

65 SPDT REPEATING; 10 POSITION ZERO (0) AND FIVE (5) ALTERNATING

AVAILABLE TERMINATIONS

0, 1, 3, A, L, P, W, Y

WHEEL	SIG. CONN. TO C		
	0	5	C
0	●		●
5		●	●
0	●		●
5		●	●
0	●		●
5		●	●
0	●		●
5		●	●
0	●		●
5		●	●
	3	5	7
	TERM. LOC.		

See figs. 2 & 3, page F-15.

91 BLANK SECTION (INACTIVE)

AVAILABLE TERMINATIONS

9

98 IC ROM, 32 WORD x 8 BIT, USER PROGRAMMABLE; ADDRESS 0 THRU 9

AVAILABLE TERMINATIONS

L, P

99 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-17 AND CONSULT FACTORY.

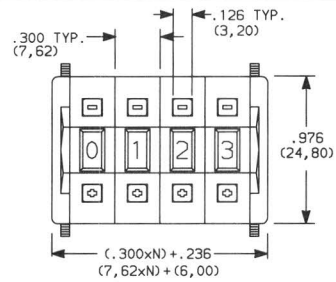
F

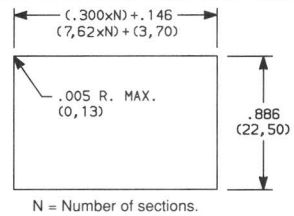
MOUNTING STYLE

0 SNAP-IN FRONT MOUNTING

SECTION PITCH: .300 (7,62)







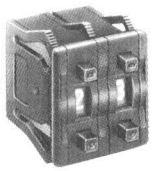
N = Number of sections.

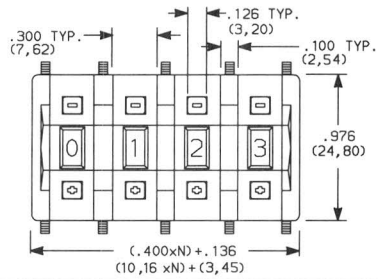
RECOMMENDED PANEL THICKNESS
.039 – .156
(0,99) – (3,95)

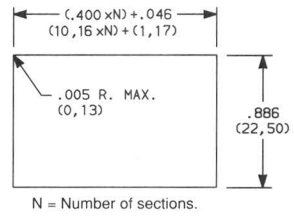
3 SNAP-IN FRONT MOUNTING W/ SPACER

SECTION PITCH: .400 (10,16)

NEW







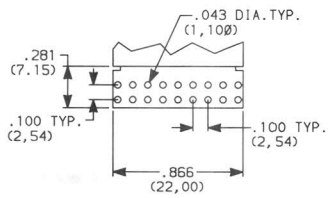
N = Number of sections.

RECOMMENDED PANEL THICKNESS
.039 – .156
(0,99) – (3,95)

TERMINATIONS

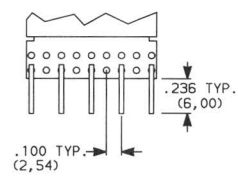
Note: All terminal holes shown may not be present for all function codes. consult factory.

0 (STD.)



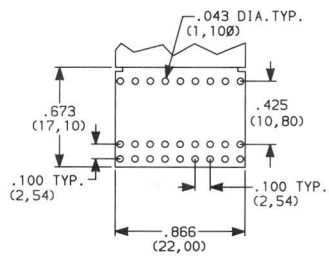
P.C. BOARD 1/32" (0,79) THK.

3 TYPE 0 W/SOLDER PINS



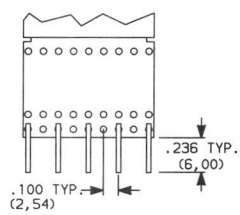
See fig. 1, below.

1 EXTENDED BOARD W/PROVISION FOR COMPONENTS



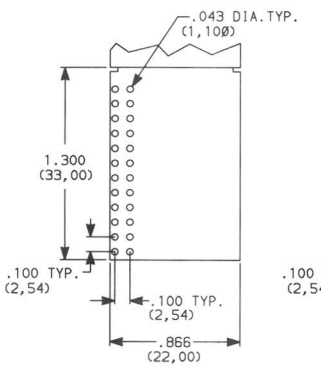
P.C. BOARD 1/32" (0,79) THK.
Signal traces cut except for common(s).

A TYPE 1 W/SOLDER PINS



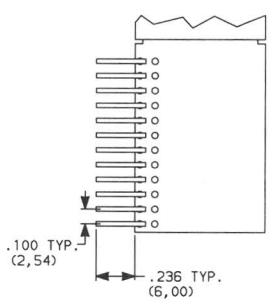
See fig. 1, below.

L RIGHT ANGLE BOARD



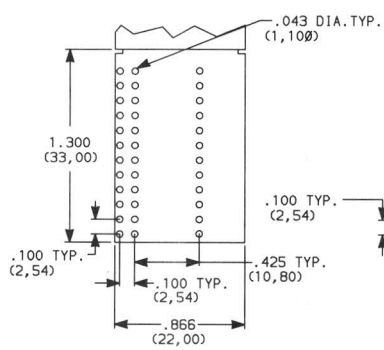
P.C. BOARD 1/32" (0,79) THK

P TYPE L W/SOLDER PINS



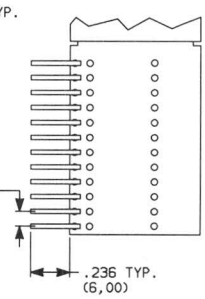
See fig. 1, below.
Unsuitable for panel mounting.

W RIGHT ANGLE BOARD WITH PROVISION FOR COMPONENTS



P.C. BOARD 1/32" (0,79) THK.
Signal traces cut except for common(s).

Y TYPE W W/SOLDER PINS



See fig. 1, below.
Unsuitable for panel mounting.

M SPECIAL TERMINATION

CONSULT FACTORY

9 ANY COMBINATION OF TERMINATION CONFIGURATIONS.

SPECIFY ON CONFIGURATION FORM, PAGE F-17, AND CONSULT FACTORY.

F

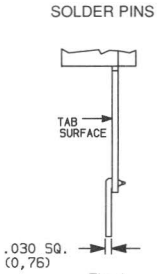


Fig. 1

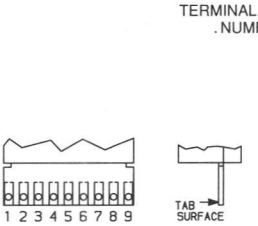


Fig. 2

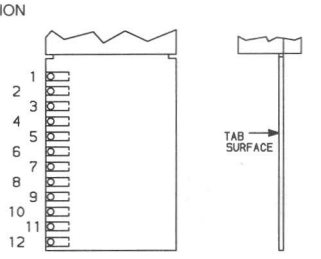


Fig. 3

See function codes, page F-14 for signal locations.

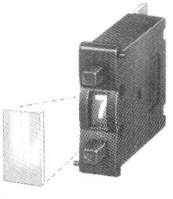
COLOR / MARKINGS / STOPS

0 (STD.) Matte black housing; Gloss black wheel with white characters; Black pushbuttons; no stops.

1 Matte gray housing; Gloss black wheel with white characters; Black pushbuttons; no stops.

9 Special color, markings for housing or wheel, stops, specify on CONFIGURATION FORM, page F-17, and (consult factory).

DUST LENS



0 (STD.) No Lens.

2 Dust Lens (protects character face of the wheel from abrasion and dust).

HOW TO ORDER

All available 3P SERIES MINIATURE PUSHWHEEL SWITCH options are listed on page F-13, and are described on pages F-13 thru F-16. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F–17, for special instructions.

Endplates, blank sections and spacers are available separately, see catalog section H.

F

SPECIFICATIONS

CONTACT RATING:
CARRY: 1 AMP continuous.
SWITCH: 100 mA max.

OPERATING VOLTAGE: 50 mV to 28 V DC.

ELECTRICAL LIFE: 100,000 actuations through revolutions of 360° thru a total of 1,000,000 detents.

CONTACT RESISTANCE: Below 300 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min. (dry).

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between common terminal and any output.

OPERATING TEMPERATURE: –10°C to 65°C.

MATERIALS

SWITCH BODY: ABS plastic.

PUSHWHEEL: Nylon 6/6.

PUSHBUTTON: Delrin.

ROTOR CONTACTS: Gold over nickel over copper alloy.

STATOR CONTACTS: Hard gold over nickel over 2 oz. copper on epoxy fiberglass.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO. 3 P _ _ _ _ _ _ _ — C&K PART NUMBER _ _ _ _ _

C&K PART NUMBER

COMPANY NAME _____ REVISION: _____

ADDRESS _____ TEL.# _____

CUSTOMER CONTACT _____ DATE _____

ORIGINATED BY _____ SALES REP. _____

DETAILS:

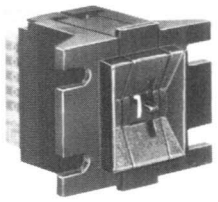
PUSHWHEEL SECTIONS	NO. OF SEC.	FUNCTION CODE – TERMINATIONS – COLOR/MARKINGS/STOPS – DUST LENS ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION CODES INCLUDE BLANK SECTIONS (SEE CATALOG PAGE F-14).	DESCRIBE IN APPROPRIATE ROW
1	1	3 P – _ _ – _ _ _	
2	2	3 P – _ _ – _ _ _	
3	3	3 P – _ _ – _ _ _	
4	4	3 P – _ _ – _ _ _	
5	5	3 P – _ _ – _ _ _	
6	6	3 P – _ _ – _ _ _	
7	7	3 P – _ _ – _ _ _	
8	8	3 P – _ _ – _ _ _	
9	9	3 P – _ _ – _ _ _	
0	10	3 P – _ _ – _ _ _	
1	11	3 P – _ _ – _ _ _	
2	12	3 P – _ _ – _ _ _	
3	13	3 P – _ _ – _ _ _	
4	14	3 P – _ _ – _ _ _	
5	15	3 P – _ _ – _ _ _	
6	16	3 P – _ _ – _ _ _	

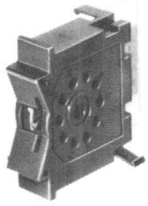
FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

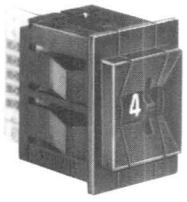
SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET ____ OF ____

C&K COMPONENTS, INC. 15 Riverdale Ave. Newton, MA 02158-1082 Tel: (617) 964-6400, Telex: 92-2544, Fax: (617) 527-3062

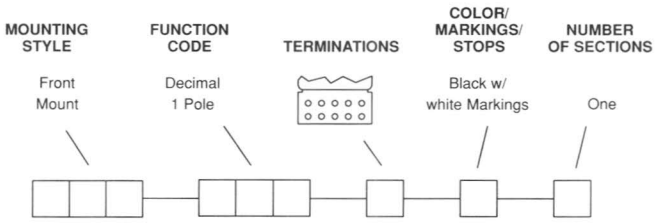






Easy Build-A-Switch:

Below is a complete listing of available options for S2 SERIES SUBMINIATURE THUMBWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages F-19 thru F-22. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-22. Use CONFIGURATION FORM, page F-23, for special instructions. Hardware is available separately, see catalog section H.



MOUNTING STYLE	FUNCTION CODE	TERMINATIONS	COLOR/ MARKINGS/ STOPS	NUMBER OF SECTIONS
S2D	012	9	0	0
S2F	018	A	9	1
S2R	021	B		2
S2S	022	C		3
S2T	054	E		4
	057	L		5
	091	M		6
	092	P		7
	099	S		8
	120	T		9
	121			
	122			

Special switch no. assigned by C&K.

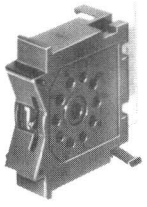


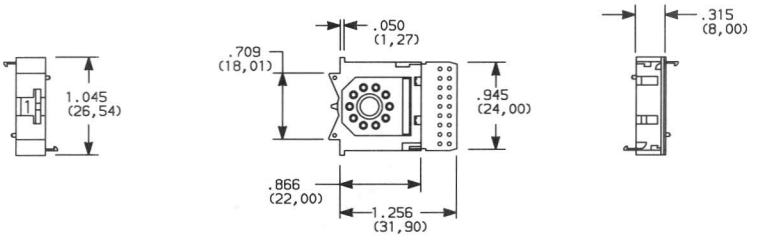
Configuration form required, see page F-23.

F

MOUNTING STYLE

S2D SWITCH SECTION ONLY (END PLATES NOT SUPPLIED)

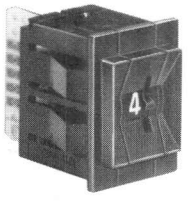


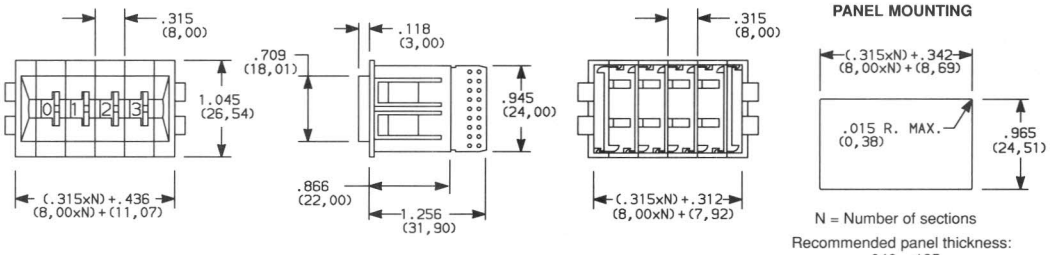


MUST BE ORDERED WITH 0 NUMBER OF SECTIONS OPTION, SEE PAGE F-22.

Part No. Shown: S2DXXXS00

S2F SNAP-IN FRONT MOUNTING



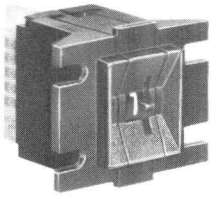


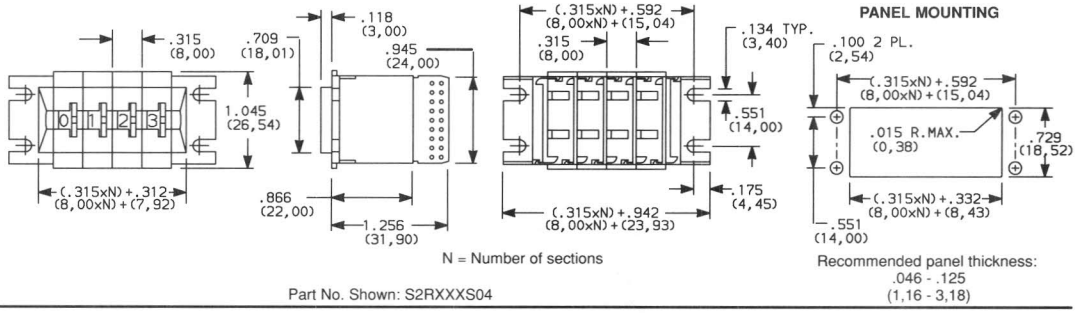
N = Number of sections

Recommended panel thickness:
.046 - .125
(1,16 - 3,18)

Part No. Shown: S2FXXXS04

S2R REAR MOUNT (8MM FLANGE)



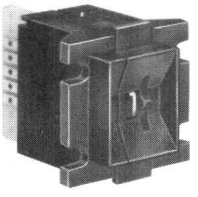


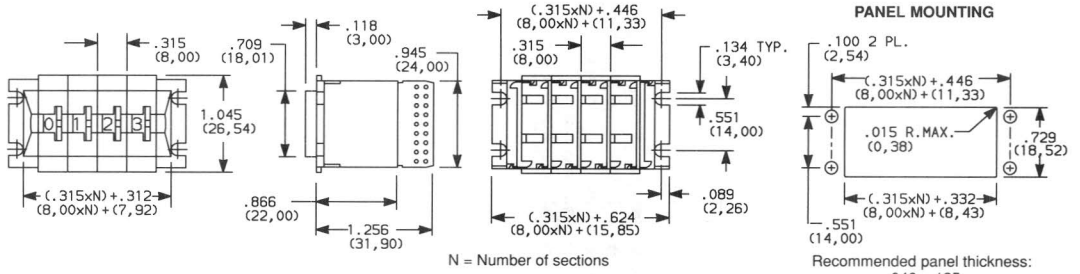
N = Number of sections

Recommended panel thickness:
.046 - .125
(1,16 - 3,18)

Part No. Shown: S2RXXXS04

S2S REAR MOUNT (4MM FLANGE)



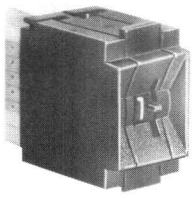


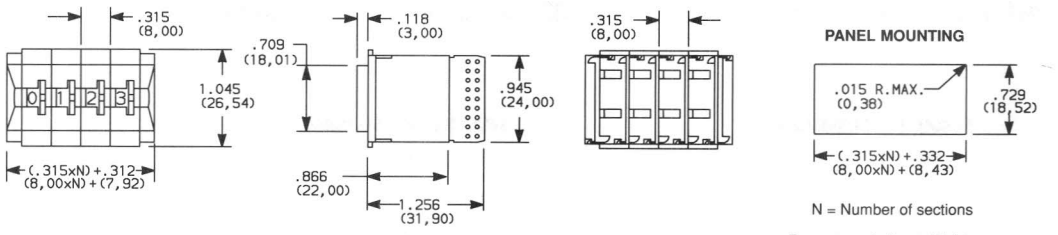
N = Number of sections

Recommended panel thickness:
.046 - .125
(1,16 - 3,18)

Part No. Shown: S2SXXXS04

S2T REAR MOUNT (NO FLANGE)





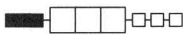
N = Number of sections

Recommended panel thickness:
.046 - .125
(1,16 - 3,18)

Part No. Shown: S2TXXXS04

F

FUNCTION CODE



For terminal location diagrams, see page F-22.

012 DECIMAL – 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

E, S

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL C									
	0	1	2	3	4	5	6	7	8	9	C
0	●										●
1		●									●
2			●								●
3				●							●
4					●						●
5						●					●
6							●				●
7								●			●
8									●		●
9										●	●
	11	10	9	8	7	6	5	4	3	2	1
	TERM. LOCATION										

See fig. 2, page F-22.

018 COMPLEMENT OF BCD; 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

C, E, L, P, S, T

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0	●	●	●	●	●
1		●	●	●	●
2	●		●	●	●
3			●	●	●
4	●	●		●	●
5		●		●	●
6	●			●	●
7				●	●
8	●	●	●		●
9		●	●		●
	4	5	6	7	3
Terminal locations for L or P termination options only. →	2	3	4	5	1
	TERM. LOCATION				

See figs. 1 & 3, page F-22.

021 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, E, L, P, S, T

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	4	5	6	7	3
Terminal locations for L or P termination options only. →	2	3	4	5	1
	TERM. LOCATION				

See figs. 1 & 3, page F-22.

022 BCD; 1-2-4-8 W/COMPLEMENT,ONE COMMON; 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, E, S, T

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL C							
	1	2	4	8	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0					●	●	●	●	●
1	●					●	●	●	●
2		●			●		●	●	●
3	●	●					●	●	●
4			●		●	●		●	●
5	●		●			●		●	●
6		●	●		●			●	●
7	●	●	●					●	●
8				●	●	●	●		●
9	●			●		●	●		●
	9	8	7	6	1	2	3	4	5
	TERM. LOCATION								

See fig. 1, page F-22.

054 BINARY CODED HEXADECIMAL; 1 POLE 16 POSITION, 0-9, A-F
057 BINARY CODED HEXADECIMAL; 1 POLE 16 POSITION, 0-15

AVAILABLE TERMINATIONS

A, B, C, E, S, T

54 WHEEL	57 WHEEL	SIGNALS CONN. TO COMMON SIG. C				
		1	2	4	8	C
0	0					●
1	1	●				●
2	2		●			●
3	3	●	●			●
4	4			●		●
5	5	●		●		●
6	6		●	●		●
7	7	●	●	●		●
8	8				●	●
9	9	●			●	●
A	10		●		●	●
B	11	●	●		●	●
C	12			●	●	●
D	13	●		●	●	●
E	14		●	●	●	●
F	15	●	●	●	●	●
		4	5	6	7	3
		TERM. LOCATION				

See fig. 1, page F-22.

120 1 POLE; 10 POSITION MINUS (–) AND PLUS (+) ALTERNATING
121 1 POLE; 10 POSITION ZERO (0) AND ONE (1) ALTERNATING
122 1 POLE; 10 POSITION ZERO (0) AND FIVE (5) ALTERNATING

AVAILABLE TERMINATIONS

A, B, C, S

120 WHEEL	121 WHEEL	122 WHEEL	COMMON (C) CONNECTED TO TERMINALS INDICATED		
			1	2	C
–	0	0	●		●
+	1	5		●	●
–	0	0	●		●
+	1	5		●	●
–	0	0	●		●
+	1	5		●	●
–	0	0	●		●
+	1	5		●	●
–	0	0	●		●
+	1	5		●	●
			5	6	3
			TERM. LOCATION		

See fig. 1, page F-22.

091 BLANK SECTION (INACTIVE)

AVAILABLE TERMINATIONS

9

092 BLANK SECTION WITH RIBBED CENTER (INACTIVE)

AVAILABLE TERMINATIONS

9

099 INTERMIXED SECTIONS, SPECIFY ON CONFIGURATION FORM, PAGE F-23 AND CONSULT FACTORY.

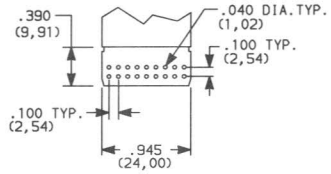
F

TERMINATIONS

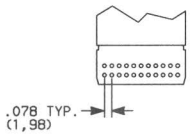
Note: All terminal holes shown may not be present for all function codes, consult factory.

S (STD.)

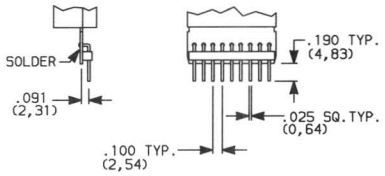
For all function codes except 012.



For function code 012.

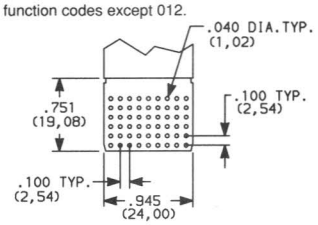


C TYPE S W/SOLDER PINS (HEADER)

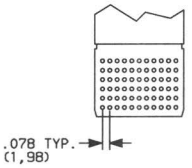


E EXTENDED BOARD

For all function codes except 012.

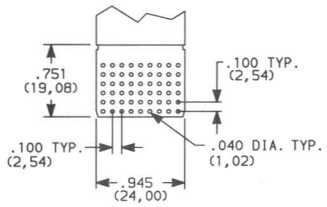


For function code 012.



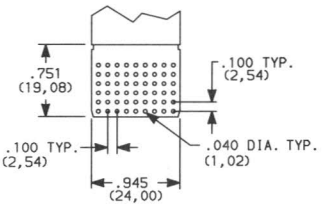
P.C. BOARD 1/32" (0,79) THK.

A WITH PROVISIONS FOR COMPONENTS

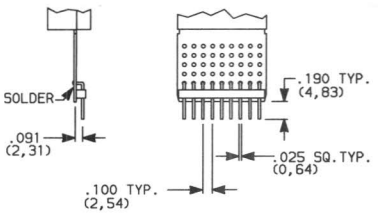


B WITH COMPONENTS MOUNTED

(CONFIGURATION FORM REQUIRED, SEE PAGE F-23)



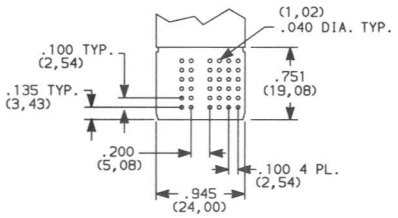
T TYPE E WITH SOLDER PINS (HEADER)



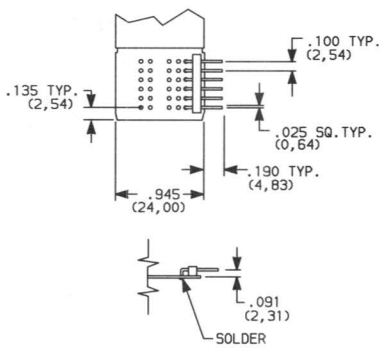
Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK

L RIGHT ANGLE



P TYPE L WITH SOLDER PINS (HEADER)



Unsuitable for panel mounting.

M SPECIAL TERMINATION

CONSULT FACTORY

9 ANY COMBINATION OF TERMINATION CONFIGURATIONS. ALSO SPECIFIED WITH FUNCTION CODES 091 AND 092.

SPECIFY ON CONFIGURATION FORM, PAGE F-23, AND CONSULT FACTORY.

P.C. BOARD 1/32" (0,79) THK.

F

TERMINAL LOCATION NUMBERS

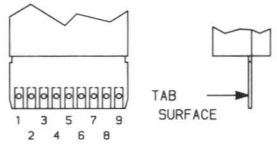


Fig. 1

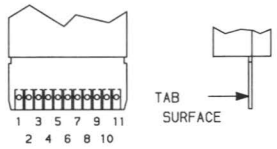


Fig. 2

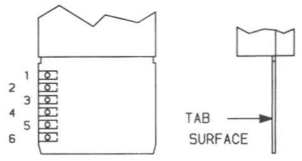


Fig. 3

See function codes, page F-20, for signal locations.

COLOR / MARKINGS / STOPS

0 (STD.) Matte black housing; Gloss black wheel with white characters.

9 Special colors, markings for housing or wheel, stops, specify on CONFIGURATION FORM, page F-23. and consult factory.

NUMBER OF SECTIONS

0 Switch section only, no endplates (must be ordered with S2D mounting style, see page F-19).

1-8 Number of switch sections in assembly, includes endplates.

9 More than 8 switch sections, specify on CONFIGURATION FORM, page F-23 and consult factory.

Note: Endplates and blank sections available separately, see catalog section H.

F

HOW TO ORDER

All available S2 SERIES SUBMINIATURE THUMBWHEEL SWITCH options are listed on page F-18, and are described on pages F-19 thru F-22. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F-23, for special instructions.

Endplates and blank sections are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
CARRY: 3 AMPS continuous.
SWITCH: 50 mA max.

OPERATING VOLTAGE: 50 mV to 50 V AC or DC.

CONTACT RESISTANCE: Below 100 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min. (dry).

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between common terminal and any output.

OPERATING TEMPERATURE: –40°C to 70°C.

MATERIALS

SWITCH BODY: Polycarbonate.

THUMBWHEEL: Acetal.

ROTOR CONTACTS: Precious metal on copper alloy.

STATOR CONTACTS: Hard gold over nickel over copper on epoxy fiberglass.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO. S 2 _ _ _ _ _ _ _ — C&K PART NUMBER _ _ _ _ _

C&K PART NUMBER _ _ _ _ _

COMPANY NAME _____ REVISION: _

ADDRESS _____ TEL.# _____

CUSTOMER CONTACT _____ DATE _____

ORIGINATED BY _____ SALES REP. _____

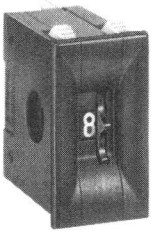
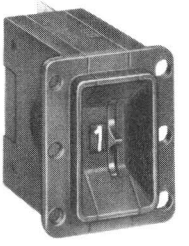
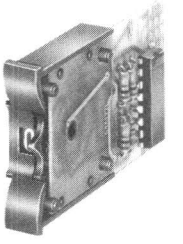
DETAILS:

THUMBWHEEL SECTIONS	NO. OF SEC.	FUNCTION CODE – TERMINATIONS – COLOR/MARKINGS/STOPS ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION CODES INCLUDE BLANK SECTIONS (SEE CATALOG PAGE F-20).	DESCRIBE IN APPROPRIATE ROW
1	1	S 2 – _ _ _ _ _ –	
2	2	S 2 – _ _ _ _ _ –	
3	3	S 2 – _ _ _ _ _ –	
4	4	S 2 – _ _ _ _ _ –	
5	5	S 2 – _ _ _ _ _ –	
6	6	S 2 – _ _ _ _ _ –	
7	7	S 2 – _ _ _ _ _ –	
8	8	S 2 – _ _ _ _ _ –	
9	9	S 2 – _ _ _ _ _ –	
0	10	S 2 – _ _ _ _ _ –	
1	11	S 2 – _ _ _ _ _ –	
2	12	S 2 – _ _ _ _ _ –	
3	13	S 2 – _ _ _ _ _ –	
4	14	S 2 – _ _ _ _ _ –	
5	15	S 2 – _ _ _ _ _ –	
6	16	S 2 – _ _ _ _ _ –	

FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

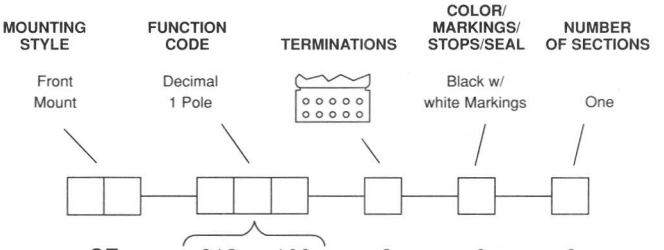
SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET ____ OF ____

Easy Build-A-Switch:

Below is a complete listing of available options for SF/SR SERIES THUMBWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages F-25 thru F-33. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-33. Use CONFIGURATION FORM, page F-34, for special instructions. Hardware is available separately, see catalog section H.



Special switch no. assigned by C&K.



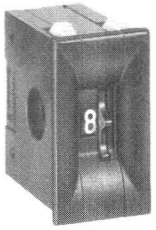
Configuration form required, see page F-34.

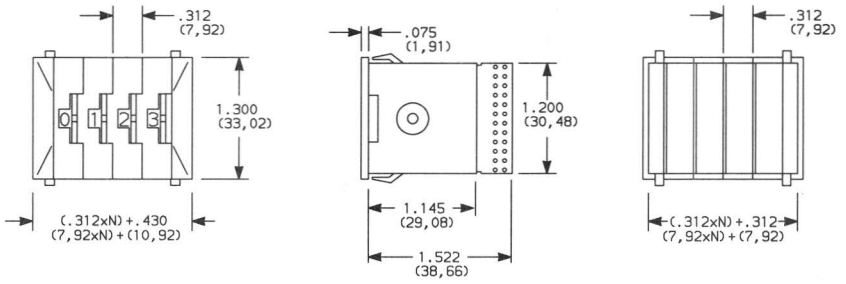
SF	012	160	9	0	0
SR	013	161	A	9	1
	014	163	B	J	2
	017	164	C		3
	018	165	E		4
	019	166	M		5
	020	167	N		6
	021	168	R		7
	022	169	S		8
	023	170	T		9
	048	171	U		
	050	172			
	052	173			
	053	174			
	054	176			
	055	177			
	056	178			
	057	179			
	060	180			
	061	181			
	066	182			
	072	183			
	074	184			
	091	185			
	092	187			
	099				

F

MOUNTING STYLE

SF SNAP-IN FRONT MOUNTING

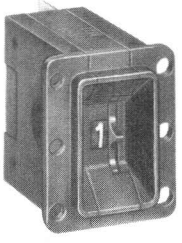


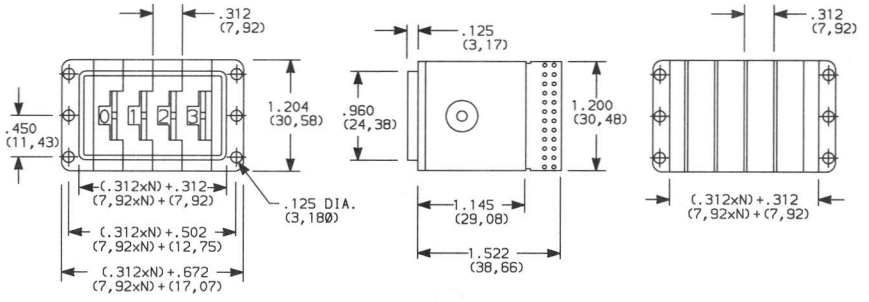


N = Number of Sections

Part No. Shown: SFXXXS04

SR REAR MOUNTING



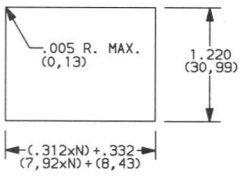


N = Number of Sections

Part No. Shown: SRXXXS04

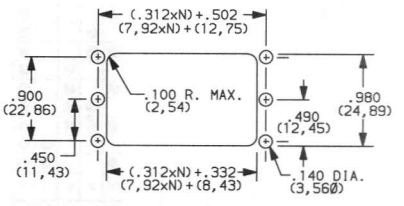
PANEL MOUNTING

SF



N = Number of sections

SR



Recommended Panel Thickness:
.046 – .125 (1,16 – 3,18)

F

FUNCTION CODE ■□□□-□□□

For terminal location diagram, see Fig.1, page F-32.

012 DECIMAL – 1 POLE; 10 POSITION
014 DECIMAL – 1 POLE; 10 POSITION, MAKE BEFORE BREAK

AVAILABLE TERMINATIONS
012 MODELS

A, B, C, E, N, R, S, T

AVAILABLE TERMINATIONS
014 MODELS

C, S

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL C									
	0	1	2	3	4	5	6	7	8	9	C
0	●										●
1		●									●
2			●								●
3				●							●
4					●						●
5						●					●
6							●				●
7								●			●
8									●		●
9										●	●
	11	10	9	8	7	6	5	4	3	2	1
	TERM. LOCATION										

013 DECIMAL – 2 POLE; 10 POSITION, SEPARATE COMMONS

AVAILABLE TERMINATIONS

M, U

WHEEL	COMMON (C) CONN. TO TERMS. INDICATED										COMMON (C') CONN. TO TERMS. INDICATED									
	C	0	1	2	3	4	5	6	7	8	9	C'	0'	1'	2'	3'	4'	5'	6'	7'	8'	9'
0	●	●										●	●									
1	●		●									●		●								
2	●			●								●			●							
3	●				●							●				●						
4	●					●						●					●					
5	●						●					●						●				
6	●							●				●							●			
7	●								●			●								●		
8	●									●		●									●	
9	●										●	●										●
	FOR TERMINAL LOCATIONS CONSULT C & K.																					

017 BCD WITH EXCESS 3 NOTATION; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

C, S

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0	●	●			●
1			●		●
2	●		●		●
3		●	●		●
4	●	●	●		●
5				●	●
6	●			●	●
7		●		●	●
8	●	●		●	●
9			●	●	●
	10	2	8	4	6
	TERM. LOCATION				

018 COMPLEMENT OF BCD; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, N, R, S

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0	●	●	●	●	●
1		●	●	●	●
2	●		●	●	●
3			●	●	●
4	●	●		●	●
5		●		●	●
6	●			●	●
7				●	●
8	●	●	●		●
9		●	●		●
	10	4	2	8	6
	TERM. LOCATION				

019 BCD WITH ODD BIT PARITY; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

C, S

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL C					
	1	2	4	8	P	C
0					●	●
1	●					●
2		●				●
3	●	●			●	●
4			●			●
5	●	●	●		●	●
6			●		●	●
7	●	●	●			●
8				●		●
9	●			●	●	●
	12	10	8	4	2	6
	TERM. LOCATION					

020 BCD WITH 10 AT 0; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, N, R

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0		●		●	●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	2	10	8	4	6
	TERM. LOCATION				

021 BCD 0–9; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, E, N, R, S, T

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	10	8	6	2	4
	TERM. LOCATION				

022 BCD WITH COMPLEMENT 0–9; 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, N, R, S

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL C								
	1	2	4	8	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0					●	●	●	●	●
1	●					●	●	●	●
2		●			●		●	●	●
3	●	●					●	●	●
4			●		●	●		●	●
5	●		●		●			●	●
6		●	●		●				●
7	●	●	●						●
8				●	●	●	●	●	
9	●			●		●	●		●
	3	4	5	6	10	9	8	7	2
	TERM. LOCATION								

F

FUNCTION CODE

For terminal location diagram, see Fig.1, page F-32.

023 AIKEN CODE 1-2-4-2'; 10 POSITION

AVAILABLE TERMINATIONS

A, B, N, R

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	2'	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●	●		●	●
6			●	●	●
7	●		●	●	●
8		●	●	●	●
9	●	●	●	●	●
	10	7,8	4,5	2	12
	TERM. LOCATION				

048 DECIMAL – 1 POLE; 11 POSITION

AVAILABLE TERMINATIONS

C, S

WHEEL	SIGNALS CONN. TO COMM. SIG. C										
	0	1	2	3	4	5	6	7	8	9	10	C
0	●											●
1		●										●
2			●									●
3				●								●
4					●							●
5						●						●
6							●					●
7								●				●
8									●			●
9										●		●
10											●	●
	12	11	10	9	8	7	6	5	4	3	2	1
	TERM. LOCATION											

052 DECIMAL; 1 POLE, 16 POSITION 0-9, A-F
055 DECIMAL; 1 POLE, 16 POSITION 0-15

AVAILABLE TERMINATIONS

M, U

52	55	SIGNALS CONN. TO COMMON SIG. C															
WHEEL	WHEEL	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	C
0	0	●																●
1	1		●															●
2	2			●														●
3	3				●													●
4	4					●												●
5	5						●											●
6	6							●										●
7	7								●									●
8	8									●								●
9	9										●							●
A	10											●						●
B	11												●					●
C	12													●				●
D	13														●			●
E	14															●		●
F	15																●	●
		FOR TERMINAL LOCATIONS CONSULT C & K.																

053 HEXADECIMAL COMPLEMENT; 1 POLE, 16 POSITION 0-9, A-F
056 HEXADECIMAL COMPLEMENT; 1 POLE, 16 POSITION 0-15

AVAILABLE TERMINATIONS

A, B, C, N, R, S

53	56	SIGNALS CONN. TO COMMON SIG. C				
WHEEL	WHEEL	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0	0	●	●	●	●	●
1	1		●	●	●	●
2	2	●		●	●	●
3	3			●	●	●
4	4	●	●		●	●
5	5		●		●	●
6	6	●			●	●
7	7				●	●
8	8	●	●	●		●
9	9		●	●		●
A	10	●		●		●
B	11			●		●
C	12	●	●			●
D	13		●			●
E	14	●				●
F	15					●
		10	8	6	2	4
		TERM. LOCATION				

054 BINARY CODED HEXADECIMAL; 1 POLE, 16 POSITION 0-9, A-F
057 BINARY CODED HEXADECIMAL; 1 POLE, 16 POSITION 0-15

AVAILABLE TERMINATIONS

A, B, C, E, N, R, S, T

54	57	SIGNALS CONN. TO COMMON SIG. C				
WHEEL	WHEEL	1	2	4	8	C
0	0					●
1	1	●				●
2	2		●			●
3	3	●	●			●
4	4			●		●
5	5	●		●		●
6	6		●	●		●
7	7	●	●	●		●
8	8				●	●
9	9	●			●	●
A	10		●		●	●
B	11	●	●		●	●
C	12			●	●	●
D	13	●		●	●	●
E	14		●	●	●	●
F	15	●	●	●	●	●
		10	8	6	2	4
		TERM. LOCATION				

091 BLANK SECTION (INACTIVE)

AVAILABLE TERMINATIONS

9

092 BLANK SECTION WITH RIBBED CENTER (INACTIVE)

AVAILABLE TERMINATIONS

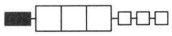
9

099 INTERMIXED SECTIONS

SPECIFY ON CONFIGURATION FORM, PAGE F-34 AND CONSULT FACTORY

F

FUNCTION CODE



For terminal location diagram, see Fig.1, page F-32.

061 KELVIN-VARLEY VOLTAGE DIVIDER

AVAILABLE TERMINATIONS

A, B, N, R

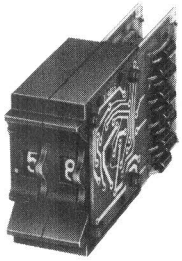
CONFIGURATION FORM REQUIRED FOR B AND R TERMINATIONS, SEE PAGE F-34.

The Kelvin-Varley Voltage Divider contains the lowest component count in the industry to assure maximum reliability and long life. These dividers use a cascade arrangement of resistors to accurately divide voltages.

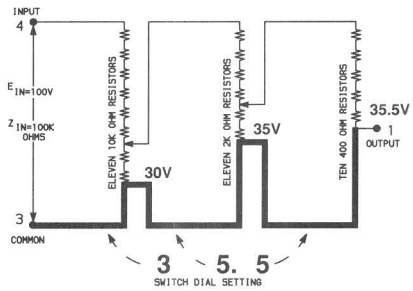
The accuracy and the resolution is not solely dependent on the accuracy of the resistors used, but mainly in the number of decades used. For example: a 100 volt signal can be divided in 10 volt steps with a 10 volt resolution with only one decade; or 1 volt steps with a 1 volt resolution with 2 decades; or the same 100 volt signal can be divided in 1mV steps with 1mV resolution using a 5 decade bank. All this is accomplished while the input impedance of the divider remains constant.

In each decade, all the resistors have the same values. The accuracy of these dividers is always defined as a percentage of "full scale voltage", not of "setting". For instance, an accuracy of 0.01% of full scale of a 100V signal input is +/– 10mV at any setting.

When ordered with termination type B or R, a value must be supplied for Input Resistance and Accuracy (%) Full Scale Voltage, a configuration form must be completed (see page F-34).



WHEEL	PINS 1 AND 2 CONNECTED ACROSS RESISTORS INDICATED													
	R0	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	1	2	3	4
0	●	●													
1		●	●												
2			●	●											
3				●	●										
4					●	●									
5						●	●								
6							●	●							
7								●	●						
8									●	●					
9										●	●				
												8, 10	4, 6	12	1, 2
	TERM. LOCATION														



Typical three decade connection (rear view).

INPUT RESISTANCE – 1K to 100K ohms
ACCURACY (%) FULL SCALE VOLTAGE – 0.1, 0.5 and 1.0

F

066 9'S COMPLEMENT OF BCD; 10 POSITION

AVAILABLE TERMINATIONS

A, B, C, N, R, S

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0	●			●	●
1				●	●
2	●	●	●		●
3		●	●		●
4	●		●		●
5			●		●
6	●	●			●
7		●			●
8	●				●
9					●
	6	8	2	4	10
	TERM. LOCATION				

074 RESISTANCE DECADE; 1-2-3-6 CODE, 10 POSITION

(WITHOUT COMPONENTS)

AVAILABLE TERMINATIONS

A, B, N, R

CONFIGURATION FORM REQUIRED FOR B AND R TERMINATIONS, SEE PAGE F-34.

WHEEL	RESISTORS IN CIRCUIT					
	R1	R2	R3	R6	A	B
0					●	●
1	●					
2		●				
3			●			
4	●		●			
5		●	●			
6				●		
7	●			●		
8		●		●		
9			●	●		
					10	2
	TERM. LOCATION					

FUNCTION CODE

For terminal location diagram, see Fig.1, page F-32.

072, 160, 161, 163, 164, 165

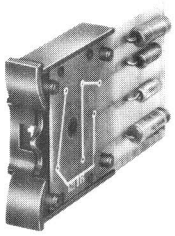
AVAILABLE TERMINATIONS
160, 161, 163, 164, 165 MODELS

B

AVAILABLE TERMINATIONS
072 MODEL

A, B

CONFIGURATION FORM REQUIRED FOR 072 MODELS WHEN ORDERED WITH B TERMINATIONS, SEE PAGE F-34.



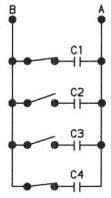
CAPACITANCE DECADE

This switch uses a 1-2-3-4 code specifically for low component count and high reliability. All capacitors are of high quality type (consult factory for capacitor specifications), and are fully tested before and after assembly. For best results, paralleling the commons of all the switches will obtain a high accuracy and resolution as shown in the schematic.

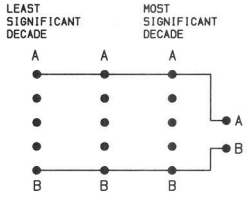
FUNCTION CODE	CAPACITANCE RANGE	MAXIMUM VOLTAGE
072	Without Components	
160	10 to 90.0 µf	10 V DC
161	1 to 9.0 µf	15 V DC
163	0.1 to 0.9 µf	25 V DC
164	0.01 to 0.09 µf	50 V DC
165	0.001 to 0.009 µf	100 V DC

Other capacitors available, consult factory.

WHEEL	CAPACITORS IN CIRCUIT C1	C2	C3	C4	B
0					●
1	●				●
2		●			●
3			●		●
4				●	●
5	●			●	●
6		●		●	●
7			●	●	●
8	●		●	●	●
9		●	●	●	●
	10	7	4	2	12
	TERM. LOCATION				



SCHEMATIC



Typical three decade connection (rear view).

060, 166, 167, 168, 169, 170, 171, 172

1, 2, 2, 2 CODE

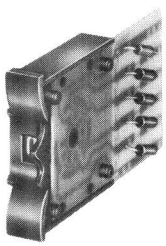
AVAILABLE TERMINATIONS
166 THRU 172 MODELS

B, R

AVAILABLE TERMINATIONS
060 MODEL

A, B, N, R

CONFIGURATION FORM REQUIRED FOR 060 MODELS WHEN ORDERED WITH B AND R TERMINATIONS, SEE PAGE F-34.

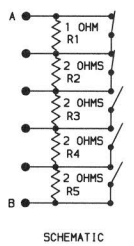


RESISTANCE DECADE

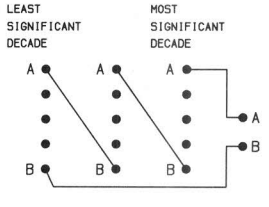
The Resistance Decade Switch is a precision built switch which includes high quality built–in resistors. This switch converts the number displayed at the window of the switch to its decimal equivalent in resistance. Resistance decade switches are fully assembled and tested with C&K's high quality precision components and equipment. A variety of resistance decades are available in a range from 0 ohms to 1M ohms, see below for specific ranges.

FUNCTION CODE	RESISTANCE RANGE
060	Without Components
166	0 to 9M ohms in 1M ohm steps
167	0 to 900K ohms in 100K ohm steps
168	0 to 90K ohms in 10K ohm steps
169	0 to 9K ohms in 1K ohm steps
170	0 to 900 ohms in 100 ohm steps
171	0 to 90 ohms in 10 ohm steps
172	0 to 9 ohms in 1 ohm steps

WHEEL	RESISTORS IN CIRCUIT BETWEEN A & B R1	R2	R3	R4	R5	A	B
0						●	●
1	●						●
2					●	●	
3	●				●		
4				●	●		
5	●			●	●		
6			●	●	●		
7	●		●	●	●		
8		●	●	●	●		
9	●	●	●	●	●		
	2, 4	4, 6	6, 8	8, 10	10, 12	2	12
	TERM. LOCATION						



SCHEMATIC



Typical three decade connection (rear view).

All resistors except for those used with section type 172 are 1% metal film rated at 1/8 watt @ 25° C type rn 55, other resistors are available depending on application, consult factory.

F

FUNCTION CODE



For terminal location diagram, see Fig.1, page F-32.

173, 174, 176, 177

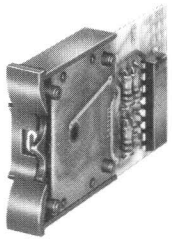
AVAILABLE TERMINATIONS
174, 176, 177 MODELS

B, R

AVAILABLE TERMINATIONS
173 MODEL

A, B, N, R

CONFIGURATION FORM REQUIRED FOR 173 MODEL WHEN ORDERED WITH B OR R TERMINATIONS, SEE PAGE F-34.



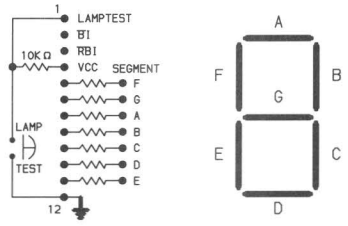
SEVEN SEGMENT DRIVER

This Seven Segment Driver has a built–in decoder driver. The decimal number displayed is converted to BCD and supplied to the decoder's BCD inputs. The Seven Segment (A thru G) lines are available at the P.C. board terminals in addition to the V_{cc}, ground, ripple blanking input and lamptest. This switch features active low outputs designed for driving common–anode LED's or incandescent indicators directly.

FUNCTION CODE	LOGIC TYPE	I.C. TYPE	OPERATING VOLTAGE	CURRENT SINK/SOURCE	MAXIMUM VOLTAGE
173	Without Components				
174	CMOS	14511B	10VDC+/–5VDC	20 mA source	20V
176	TTL	7446	5VDC+/–5%	40 mA sink	30V
177	TTL	7447	5VDC+/–5%	40 mA sink	15V

Other I.C.'s available, consult factory.

WHEEL	● DENOTES SEGMENT "ON" DIAL										
	A	B	C	D	E	F	G	Vcc	B_1	B_0	LAMPTEST	GND
0	●	●	●	●	●	●						
1		●	●									
2	●	●		●	●		●					
3	●	●	●	●			●					
4		●	●			●	●					
5	●		●	●		●	●					
6			●	●	●	●	●					
7	●	●	●									
8	●	●	●	●	●	●	●					
9	●	●	●			●	●					
	7	8	9	10	11	5	6	4	3	2	1	12
	TERM. LOCATION											



Typical connection for section types 176 and 177; for other connections, consult factory.

For typical application, the blanking inputs are not connected but may be used for special apllications. External resistors must be used to limit the LED current at outputs A thru G.

050, 178, 179

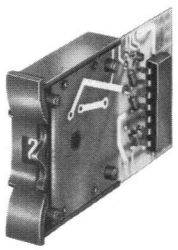
AVAILABLE TERMINATIONS
178, 179 MODELS

B, R

AVAILABLE TERMINATIONS
050 MODELS

A, B, N, R

CONFIGURATION FORM REQUIRED FOR 050 MODEL WHEN ORDERED WITH B AND R TERMINATIONS, SEE PAGE F-34.



COUNTER/TIMER DECADE

When the BCD of the counter is equal to the BCD equivalent of the decimal number displayed by the switch, an "Equal" signal at the common of the switch is generated. Blocking diodes are connected between the counter's BCD output and the switch's coded input to assure proper decoding. The "Equal" output has provisions for a "Pull–up" (Rp) resistor for cascading purposes. Carry out, count input, reset, 9's preset, equal output, in addition to power inputs are available at the P.C. board terminals.

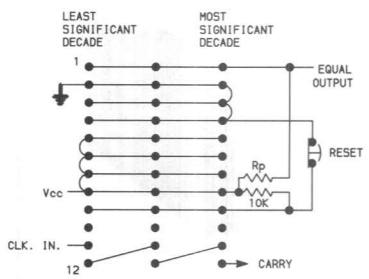
APPLICATION

Pulses applied at the count input of the LSD switch are counted and converted to BCD; the "BCD 8" output of the LSD, and so forth; when the accumulated count in the decade counter equals the number displayed by the switches, an "Equal" signal is generated at the "Equal" output.

FUNCTION CODE	LOGIC TYPE	I.C. TYPE	OPERATING VOLTAGE	Rp
050	Without Components			
178	TTL	7490A	5VDC+/–5%	510 ohms
179	CMOS	74C90	3 to 15 V DC	47K ohms

Other I.C.'s available, consult factory.

TERM NO.	FUNCTION	
1	EQUAL OUTPUT	OUT
2	GROUND	
3	GROUND	
4	9 COMPLEMENT	
5	Vcc	
6	Vcc	
7	Vcc	
8	Vcc	
9	RESET	
10	N.O.	
11	CLOCK INPUT	IN
12	CLOCK OUTPUT	OUT



Typical three decade connection (rear view).
For typical application, C&K suggests terminal #4 be grounded.

Only one "Pull-up (Rp) resistor is recommended per system, other resistors of different values may be used for specific applications, consult factory.

FUNCTION CODE

For terminal location diagram, see Fig.1, page F-32.

180, 181, 182, 183, 184, 185, 187

DIGITAL COMPARATOR

AVAILABLE TERMINATIONS
180 THRU 185 MODELS

B, R

AVAILABLE TERMINATIONS
187 MODEL

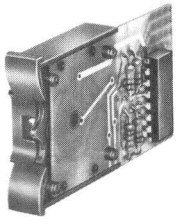
A, B, N, R

CONFIGURATION FORM REQUIRED FOR 187 MODEL WHEN ORDERED WITH B AND R TERMINATIONS, SEE PAGE F-34.

These switches have a BCD decade comparator. The switch converts the decimal number displayed by the switch into a BCD (1,2,4,8) format which is presented as Word "B" to the comparator IC. Word "A" is presented at the P.C. board terminals in addition to the "High", "Equal" and "Low" carry inputs. "High", "Equal" and "Low" carry outputs are also available at the P.C. board to enable cascading of more than one decade to form multidecade digital comparators. "Pull–up" resistors are provided at the switch end for greater noise immunity.

APPLICATION

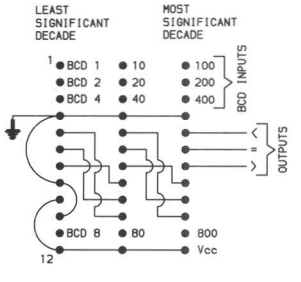
1. Unused input should be connected to ground..
2. Unused decades: BCD inputs should be connected to ground and corresponding switch set to zero.
3. Unused polarity inputs: (+) is Low and (–) is High. If it is not to be used, connect the (+) input to V_{CC} through 1K ohm resistor and set switch on "–"; if the switch is to placed on "+", ground the (+) input.



FUNCTION CODE	LOGIC TYPE	I.C. TYPE	NO. OF POSITIONS	WHEEL MARKING	OPERATING VOLTAGE
180	TTL	7485	10	0 – 9	5 V dc± 5%
181	CMOS	4063B	10	0 – 9	6 to 15 V dc
182	TTL	7485	2	0/1 stopped	5 V dc± 5%
183	CMOS	4063B	2	0/1 stopped	6 to 15 V dc
184	TTL	7485	2	+/– stopped	5 V dc± 5%
185	CMOS	4063B	2	+/– stopped	6 to 15 V dc
187	Without Components				

Other I.C.'s available, consult factory.

TERM NO.	FUNCTION	
1	BCD 0	IN
2	BCD 1	IN
3	BCD 2	IN
4	GROUND	
5	LESS THAN	OUT
6	EQUAL TO	OUT
7	GREATER THAN	OUT
8	GREATER THAN	IN
9	EQUAL TO	IN
10	LESS THAN	IN
11	BCD 4	IN
12	Vcc	



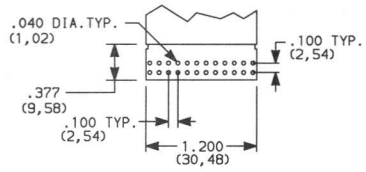
Typical three decade connection (rear view).

F

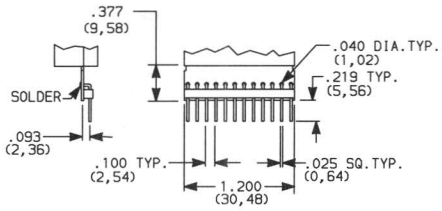
TERMINATIONS

Note: All terminal holes shown may not be present for all function codes, consult factory.

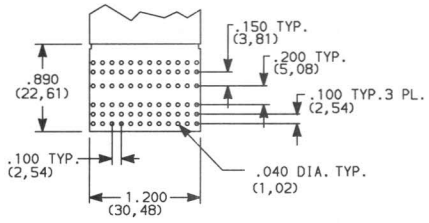
S (STD.)



C TYPE S W/SOLDER PINS (HEADER)

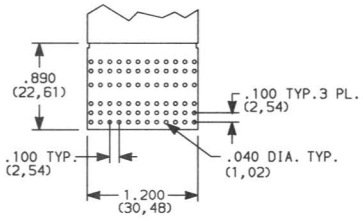


E EXTENDED BOARD

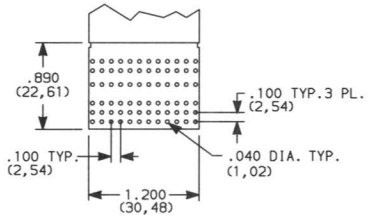


P.C. BOARD 1/32" (0,79) THK.

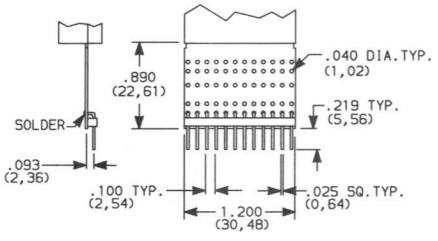
A EXTENDED BOARD WITH PROVISIONS FOR COMPONENTS



B EXTENDED BOARD WITH COMPONENTS MOUNTED



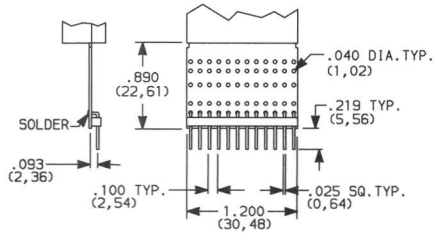
T TYPE E WITH SOLDER PINS (HEADER)



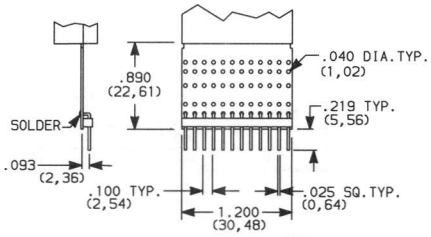
Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK

N TYPE A WITH SOLDER PINS (HEADER) AND PROVISION FOR COMPONENTS



R TYPE B WITH SOLDER PINS (HEADER) AND COMPONENTS MOUNTED



M SPECIAL TERMINATION – WITHOUT SOLDER PINS

CONSULT FACTORY

U SPECIAL TERMINATION – WITH SOLDER PINS (HEADER)

CONSULT FACTORY

9 ANY COMBINATION OF TERMINATION CONFIGURATIONS. ALSO SPECIFIED WITH FUNCTION CODES 091 AND 092.

SPECIFY ON CONFIGURATION FORM, PAGE F-34, AND CONSULT FACTORY

Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK.

TERMINAL LOCATION NUMBERS

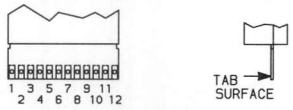


Fig. 1

See function codes, pages F-26 thru F-31, for signal locations.

COLOR / MARKING / STOPS / SEAL

0 (STD.) Matte black housing; Gloss black wheel with white characters, no stops.

J Dust lens (protects the character face of the wheel from abrasion and dust).

9 Special color, markings for housing or wheel, stops, specify on CONFIGURATION FORM, page F-34, and consult factory.

NUMBER OF SECTIONS

0 Switch section only, no assembly (Blank bodies are considered sections. Endplates are not sections).

1-8 Number of switch sections in assembly, includes endplates.

9 More than 8 switch sections, specify on CONFIGURATION FORM, page F-34 and consult factory.

Note: Endplates and blank sections are available separately, see catalog section H.

HOW TO ORDER

All available SF/SR SERIES THUMBWHEEL SWITCH options are listed on page F-24, and are described on pages F-25 thru F-33. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F-34, for special instructions.

Endplates and blank sections are available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
CARRY: 2 AMPS continuous.
SWITCH: 50 mA max.

OPERATING VOLTAGE: 50 mV to 28 V DC or 120 V AC.

CONTACT RESISTANCE: Below 100 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min. (dry).

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between common terminal and any output.

OPERATING TEMPERATURE: –40°C to 70°C.

MATERIALS

SWITCH BODY: ABS plastic.

THUMBWHEEL: ABS plastic.

ROTOR CONTACTS: Precious metal on copper alloy.

STATOR CONTACTS: Hard gold over nickel over copper on epoxy fiberglass.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

F

Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO. S | | | | | | | |

C&K PART NUMBER | | | | | |

C&K PART NUMBER

COMPANY NAME _____ REVISION:

ADDRESS _____ TEL.# _____

CUSTOMER CONTACT _____ DATE _____

ORIGINATED BY _____ SALES REP. _____

DETAILS:

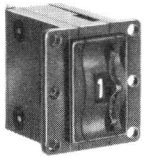
THUMBWHEEL SECTIONS	NO. OF SEC.	FUNCTION CODE – TERMINATIONS – COLOR/MARKINGS/STOPS/SEAL ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION CODES INCLUDE BLANK SECTIONS (SEE CATALOG PAGE F-27).	DESCRIBE IN APPROPRIATE ROW
1	1	S –	
2	2	S –	
3	3	S –	
4	4	S –	
5	5	S –	
6	6	S –	
7	7	S –	
8	8	S –	
9	9	S –	
0	10	S –	
1	11	S –	
2	12	S –	
3	13	S –	
4	14	S –	
5	15	S –	
6	16	S –	

FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET ____ OF ____

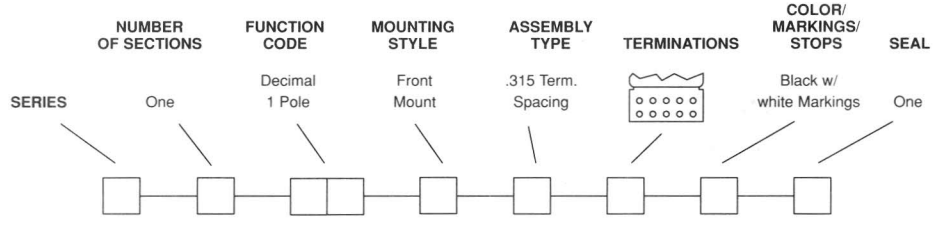






Easy Build-A-Switch:

Below is a complete listing of available options for 3 SERIES THUMBWHEEL SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. All available options are shown and described on pages F-36 thru F-44. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page F-44. Use CONFIGURATION FORM, page F-46, for special instructions. Hardware is available separately, see catalog section H.



Special switch no. assigned by C&K.

Configuration form required, see page F-46.

SERIES	NUMBER OF SECTIONS	FUNCTION CODE	MOUNTING STYLE	ASSEMBLY TYPE	TERMINATIONS	COLOR/ MARKINGS/ STOPS	SEAL
3	0	11	0	0	0	0	0
	1	12	1	3	1	1	1
	2	13	2	4	3	9	2
	3	14	3	9	4		3
	4	16			5		9
	5	21			6		
	6	22			7		
	7	23			9		
	8	24			A		
	9	26			B		
		27			C		
		28			D		
		29			E		
		31			M		
		32					
		33					
		34					
		35					
		41					
		42					
		45					
		51					
		52					
		58					
		59					
		61					
		70					
		71					
		72					
		81					
		83					
		91					
		92					
		99					

F

SERIES

3 Series

NUMBER OF SECTIONS

0 Switch section only, no assembly (Blank bodies are considered sections. Endplates are not sections). Must be ordered with 9 assembly type option, see page F-41.

1-8 Number of switch sections in assembly, includes endplates.

9 More than 8 switch sections, specify on CONFIGURATION FORM, page F-46 and consult factory.

Note: Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

FUNCTION CODE

For terminal location diagram, see page F-44.

11 DECIMAL – 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL C									
	0	1	2	3	4	5	6	7	8	9	C
0	●										●
1		●									●
2			●								●
3				●							●
4					●						●
5						●					●
6							●				●
7								●			●
8									●		●
9										●	●
	2	3	4	5	6	7	8	9	10	11	12
	TERM. LOCATION										

See fig.1, page F-44.

12 DECIMAL – 1 POLE; 10 POSITION

AVAILABLE TERMINATIONS

1, 4, 5, A, D, E

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL C									
	0	1	2	3	4	5	6	7	8	9	C
0	●										●
1		●									●
2			●								●
3				●							●
4					●						●
5						●					●
6							●				●
7								●			●
8									●		●
9										●	●
	2	3	4	5	7	8	9	10	11	12	6
	TERM. LOCATION										

See fig.1, page F-44.

13 DECIMAL; 2 POLE, 10 POSITION

AVAILABLE TERMINATIONS

M

WHEEL	COMMON A CONN. TO:	COMMON B CONN. TO:
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
FOR TERM. LOC. CONSULT C&K		

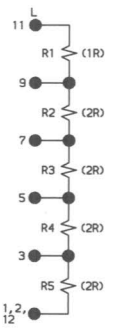
Special board, request terminal location, mechanical and electrical specifications from factory.

14 RESISTOR DECADE; 1-2-2-2-2 CODE (RESISTORS NOT SUPPLIED)

AVAILABLE TERMINATIONS

1, A

WHEEL	SWITCH CIRCUIT					
0	●					●
1	●	●				●
2	●				●	●
3	●	●			●	●
4	●		●		●	●
5	●	●	●		●	●
6	●		●	●	●	●
7	●	●	●	●	●	●
8	●	●	●	●	●	●
9	●	●	●	●	●	●
	11	9	7	5	3	1,2 12
	TERM. LOCATION					



See fig.1, page F-44.

FUNCTION CODE ■■□□□□□□

For terminal location diagram, see page F-44.

16 DECIMAL; 1 POLE, 11 POSITION

AVAILABLE TERMINATIONS

4, D

WHEEL	SIGNALS CONNECTED TO COMMON SIGNAL A										
	0	1	2	3	4	5	6	7	8	9	10	A
0	●											●
1		●										●
2			●									●
3				●								●
4					●							●
5						●						●
6							●					●
7								●				●
8									●			●
9										●		●
1.0											●	●
	1	2	3	4	5	7	8	9	10	11	12	6
	TERM. LOCATION											

See fig.1, page F-44.

21 BCD 1-2-4-8; 10 POSITION

22 OCTAL 1-2-4; 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

0, 1, 3, A

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	3	5	7	11	9
	TERM. LOCATION				

See fig.1, page F-44.

23 COMPLEMENT OF BCD 1-2-4-8; 10 POSITION

24 COMPLEMENT OF OCTAL 1-2-4, 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

0, 1, 3, A

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0	●	●	●	●	●
1		●	●	●	●
2	●		●	●	●
3			●	●	●
4	●	●		●	●
5		●		●	●
6	●			●	●
7				●	●
8	●	●	●		●
9		●	●		●
	3	9	11	5	7
	TERM. LOCATION				

See fig.1, page F-44.

26 COMPLEMENT OF BCD 1-2-4-8

AVAILABLE TERMINATIONS

6, B

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0	●	●	●	●	●
1		●	●	●	●
2	●		●	●	●
3			●	●	●
4	●	●		●	●
5		●		●	●
6	●			●	●
7				●	●
8	●	●	●		●
9		●	●		●
	4	5	1	2	3
	TERM. LOCATION				

See fig.2, page F-44.

27 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

6, B

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	4	5	1	2	3
	TERM. LOCATION				

See fig.2, page F-44.

28 COMPLEMENT OF 9'S COMPLEMENT; 10 POSITION

AVAILABLE TERMINATIONS

7, C

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0		●	●		●
1	●	●	●		●
2				●	●
3	●			●	●
4		●		●	●
5	●	●		●	●
6			●	●	●
7	●		●	●	●
8		●	●	●	●
9	●	●	●	●	●
	2	1	5	4	3
	TERM. LOCATION				

See fig.2, page F-44.

29 BCD 1-2-4-8; 10 POSITION

AVAILABLE TERMINATIONS

6, B

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	2	3	4	5	1
	TERM. LOCATION				

See fig.2, page F-44.

31 BCD 1-2-4-8; 10 POSITION

32 OCTAL 1-2-4; 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

0, 1, 3, 4, 5, A, D, E

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	2	3	11	9	8
	TERM. LOCATION				

See fig.1, page F-44.

F

FUNCTION CODE ■■□□□□□□□

For terminal location diagram, see page F-44.

33 COMPLEMENT OF BCD 1-2-4-8; 10 POSITION
34 COMPLEMENT OF OCTAL 1-2-4, 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

1, 4, 5, A, D, E

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0	●	●	●	●	●
1		●	●	●	●
2	●		●	●	●
3			●	●	●
4	●	●		●	●
5		●		●	●
6	●			●	●
7				●	●
8	●	●	●		●
9		●	●		●
	2	3	11	9	8
	TERM. LOCATION				

See fig.1, page F-44.

35 BCD 1-2-4-8 W/SEPARATE COMMON TO NOT TRUE BITS, 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A

WHEEL	SIGNALS CONN. TO COMMON SIGNALS					
	1	2	4	8	X	Y
0	○	○	○	○	●	○
1	●	○	○	○	●	○
2	○	●	○	○	●	○
3	●	●	○	○	●	○
4	○	○	●	○	●	○
5	●	○	●	○	●	○
6	○	●	●	○	●	○
7	●	●	●	○	●	○
8	○	○	○	●	●	○
9	●	○	○	●	●	○
	8	6	4	2	12	10
	TERM. LOCATION					

See fig.1, page F-44.

41 BCD 1-2-4-8; WITH COMPLEMENT, 10 POSITION
42 OCTAL 1-2-4 WITH COMPLEMENT, 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

0, 1, 3, A

WHEEL	SIGNALS CONN. TO COMM. SIG. C								
	1	2	4	8	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0					●	●	●	●	●
1	●					●	●	●	●
2		●			●		●	●	●
3	●	●					●	●	●
4			●		●	●		●	●
5	●		●		●		●	●	●
6		●	●		●			●	●
7	●	●	●					●	●
8				●	●	●	●		●
9	●			●		●	●		●
	10	9	8	7	3	4	5	6	11
	TERM. LOCATION								

See fig.1, page F-44.

45 BCD 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

0, 3

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	5	6	7	8	9
	TERM. LOCATION				

See fig.1, page F-44.

51 BCD 1-2-4-8 WITH COMPLEMENT, ONE COMMON, 10 POSITION
52 OCTAL 1-2-4 WITH COMPLEMENT, ONE COMMON, 8 POSITION (STOPPED BETWEEN 0-7 INCL.)

AVAILABLE TERMINATIONS

0, 1, 3, 4, 5, A, D, E

WHEEL	SIGNALS CONN. TO COMM. SIG. C								
	1	2	4	8	$\overline{1}$	$\overline{2}$	$\overline{4}$	$\overline{8}$	C
0					●	●	●	●	●
1	●					●	●	●	●
2		●			●		●	●	●
3	●	●					●	●	●
4			●		●	●		●	●
5	●		●		●		●	●	●
6		●	●		●			●	●
7	●	●	●					●	●
8				●	●	●	●		●
9	●			●		●	●		●
	5	4	3	2	10	9	8	7	6
	TERM. LOCATION								

See fig.1, page F-44.

58 SEVEN SEGMENT DECODER W/BLANK AND BCD OUTPUT (TTL)
SPECIAL BOARD, I.C. NOT SUPPLIED, CONSULT FACTORY

AVAILABLE TERMINATIONS

M

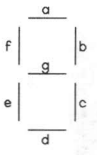
WHEEL	SIGNALS CONNECT TO COMMON GROUND												
	a	b	c	d	e	f	g	Gnd	Vcc	1	2	4	8
0	●	●	●	●	●	●		●					
1		●	●					●		●			
2	●	●		●	●		●	●			●		
3	●	●	●	●			●	●		●	●		
4		●	●			●	●	●				●	
5	●		●	●		●	●	●		●		●	
6	●		●	●	●	●	●	●			●	●	
7	●	●	●					●		●	●	●	
8	●	●	●	●	●	●	●	●					●
9	●	●	●	●		●	●	●		●			●
	FOR TERMINAL LOCATIONS CONSULT C&K												

Note: Connections for RBO and RBI supplied.

59 SEVEN SEGMENT DECODER (TTL) SPECIAL BOARD, I.C.
NOT SUPPLIED, CONSULT FACTORY

AVAILABLE TERMINATIONS

M



WHEEL	COMMON (C) CONNECTED TO TERMINAL INDICATED								
	a	b	c	d	e	f	g	Gnd	Vcc
0	●	●	●	●	●	●		●	
1		●	●					●	
2	●	●		●	●		●	●	
3	●	●	●	●			●	●	
4		●	●			●	●	●	
5	●		●	●		●	●	●	
6	●		●	●	●	●	●	●	
7	●	●	●					●	
8	●	●	●	●	●	●	●	●	
9	●	●	●	●			●	●	
	6	5	4	3	2	8	7	1	12
	TERM. LOCATION								

See fig.1, page F-44.

Note: IC not supplied, use decoder type 7446/7 or equivalent.

F

FUNCTION CODE ■■□□-□-□-□-□

For terminal location diagram, see page F-44.

61 SPDT REPEATING; PLUS (+) AND MINUS (–) ALTERNATING, 10 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, 4, 5, A, D, E

WHEEL	SIG. CONN. TO C		
	+	–	C
+	●		●
–		●	●
+	●		●
–		●	●
+	●		●
–		●	●
+	●		●
–		●	●
+	●		●
–		●	●
	9	8	2
	TERM. LOC		

See fig.1, page F-44.

70 BINARY CODED HEXADECIMAL W/PARITY BIT, 16 POSITION

AVAILABLE TERMINATIONS

0, 3

WHEEL	SIGNALS CONN. TO COMM. SIG. C					
	1	2	4	8	P	C
0					●	●
1	●					●
2		●				●
3	●	●			●	●
4			●			●
5	●		●		●	●
6		●	●		●	●
7	●	●	●			●
8				●		●
9	●			●	●	●
A		●		●	●	●
B	●	●		●		●
C			●	●	●	●
D	●		●	●		●
E		●	●	●		●
F	●	●	●	●	●	●
	3	5	7	11	1	9
	TERM. LOCATION					

See fig.1, page F-44.

71 BINARY CODED HEXADECIMAL, 16 POSITION

AVAILABLE TERMINATIONS

0, 1, 3, A

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
A		●		●	●
B	●	●		●	●
C			●	●	●
D	●		●	●	●
E		●	●	●	●
F	●	●	●	●	●
	3	5	7	11	9
	TERM. LOCATION				

See fig.1, page F-44.

72 BINARY CODED HEXADECIMAL, 16 POSITION

AVAILABLE TERMINATIONS

6, B

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
A		●		●	●
B	●	●		●	●
C			●	●	●
D	●		●	●	●
E		●	●	●	●
F	●	●	●	●	●
	2	3	4	5	1
	TERM. LOCATION				

See fig.2, page F-44.

81 BCD 1-2-4-8, 10 POSITION

AVAILABLE TERMINATIONS

6, B

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
	1	2	3	5	4
	TERM. LOCATION				

See fig.2, page F-44.

83 BINARY CODED HEXADECIMAL, 16 POSITION

AVAILABLE TERMINATIONS

6, B

WHEEL	SIGNALS CONN. TO COMM. SIG. C				
	1	2	4	8	C
0					●
1	●				●
2		●			●
3	●	●			●
4			●		●
5	●		●		●
6		●	●		●
7	●	●	●		●
8				●	●
9	●			●	●
A		●		●	●
B	●	●		●	●
C			●	●	●
D	●		●	●	●
E		●	●	●	●
F	●	●	●	●	●
	1	2	3	5	4
	TERM. LOCATION				

See fig.2, page F-44.

91 BLANK SECTION (INACTIVE)

AVAILABLE TERMINATIONS

9

92 BLANK SECTION WITH RIBBED CENTER (INACTIVE)

AVAILABLE TERMINATIONS

9

99 INTERMIXED SECTIONS

SPECIFY ON CONFIGURATION FORM, PAGE F-46 AND CONSULT FACTORY.

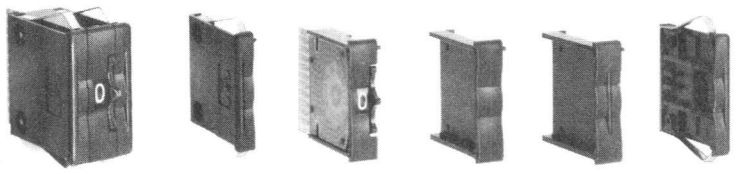
AVAILABLE TERMINATIONS

CONSULT FACTORY

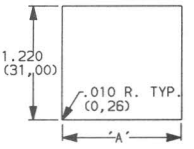
F

MOUNTING STYLE

0 SNAP-IN FRONT MOUNTING



PANEL MOUNTING

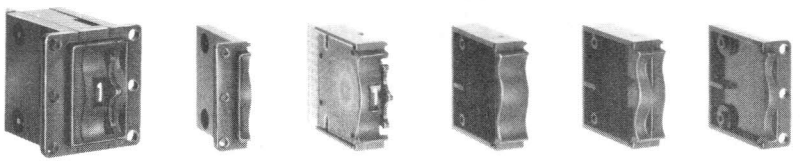


DIM. A	ASSEMBLY TYPE see pg. F-41
(.315 x N) + .326 (8,0 x N) + (8,28)	0
(.394 x N) + .326 (10,0 x N) + (8,28)	3
(.500 x N) + .326 (12,7 x N) + (8,28)	4

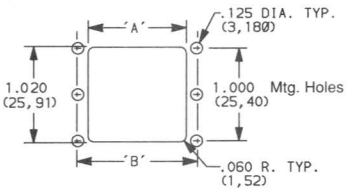
N = Number of sections

Recommended Panel Thickness:
.046 – .125 (1,16 – 3,18)

1 REAR MOUNTING



PANEL MOUNTING

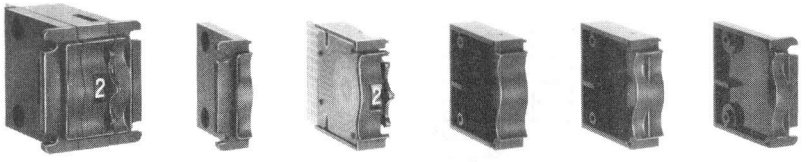


DIM. A	DIM B	ASSEMBLY TYPE see pg. F-41
(.350 x N) + .340 (8,89 x N) + (8,64)	(.350 x N) + .560 (8,89) x N) + (14,22)	0
(.500 x N) + .340 (12,7 x N) + (8,64)	(.500 x N) + .560 (12,7 x N) + (14,22)	4

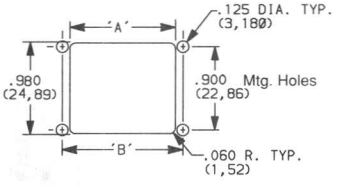
N = Number of sections

Recommended Panel Thickness:
.046 – .125 (1,16 – 3,18)

2 REAR MOUNTING



PANEL MOUNTING



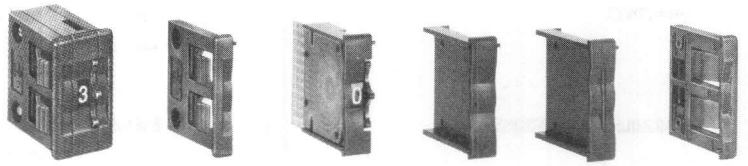
DIM. A	DIM B	ASSEMBLY TYPE see pg. F-41
(.350 x N) + .420 (8,89 x N) + (10,67)	(.350 x N) + .590 (8,89 x N) + (14,99)	0
(.500 x N) + .420 (12,7 x N) + (10,67)	(.500 x N) + .590 (12,7 x N) + (14,99)	4

N = Number of sections

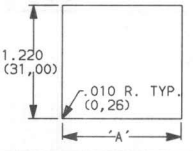
Recommended Panel Thickness:
.046 – .125 (1,16 – 3,18)

3 SNAP-IN FRONT MOUNTING

NEW



PANEL MOUNTING



DIM. A	ASSEMBLY TYPE see pg. F-41
(.315 x N) + .360 (8,0 x N) + (9,14)	0
(.394 x N) + .360 (10,0 x N) + (9,14)	3
(.500 x N) + .360 (12,7 x N) + (9,14)	4

N = Number of sections

Recommended Panel Thickness:
.046 – .125 (1,16 – 3,18)

F

ASSEMBLY TYPE

0 Switch assembly with end plates. .315 terminal spacing, center to center, front mounting. .350 terminal spacing, center to center, rear mounting.

3 Switch assembly with end plates and spacer(s). 10mm terminal spacing, center to center, front mounting only.

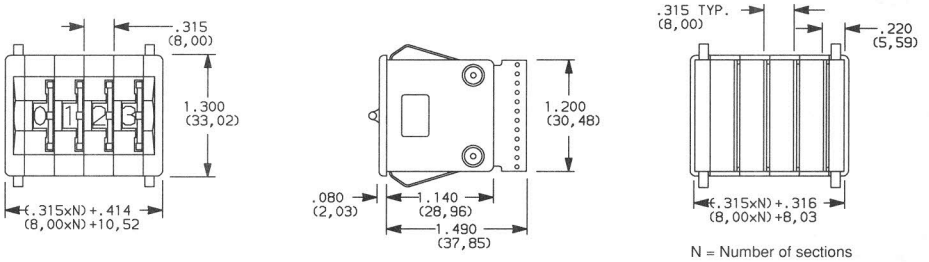
4 Switch assembly with end plates and spacer(s). 0.50 terminal spacing, center to center, front and rear mounting.

9 Switch sections unassembled without endplates, front and rear mounting. (Must be ordered with 0 number of sections option, see page F-36).

Note: Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

MOUNTING STYLES AND ASSEMBLY TYPES ILLUSTRATED

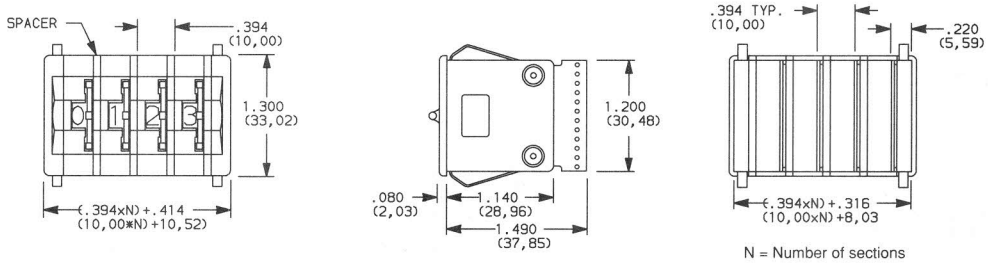
SECTION PITCH: .315 (8,00)
MOUNTING STYLE: 0
ASSEMBLY TYPE: 0



N = Number of sections

SNAP-IN FRONT MOUNTING

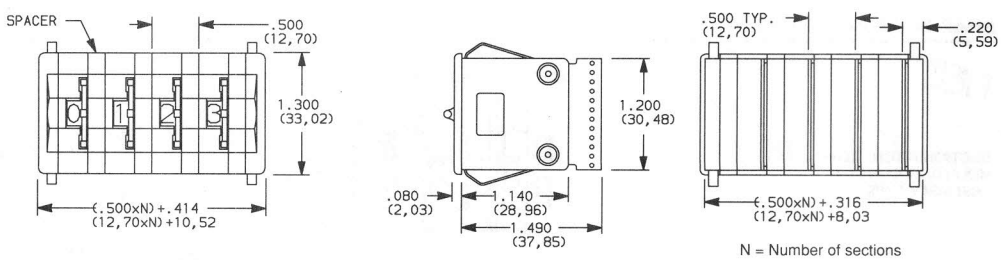
SECTION PITCH: 10mm
MOUNTING STYLE: 0
ASSEMBLY TYPE: 3



N = Number of sections

SNAP-IN FRONT MOUNTING

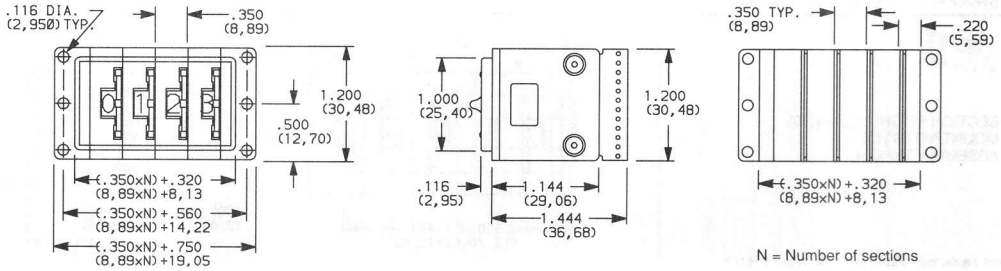
SECTION PITCH: .500 (12,70)
MOUNTING STYLE: 0
ASSEMBLY TYPE: 4



N = Number of sections

SNAP-IN FRONT MOUNTING

SECTION PITCH: .350 (8,89)
MOUNTING STYLE: 1
ASSEMBLY TYPE: 0



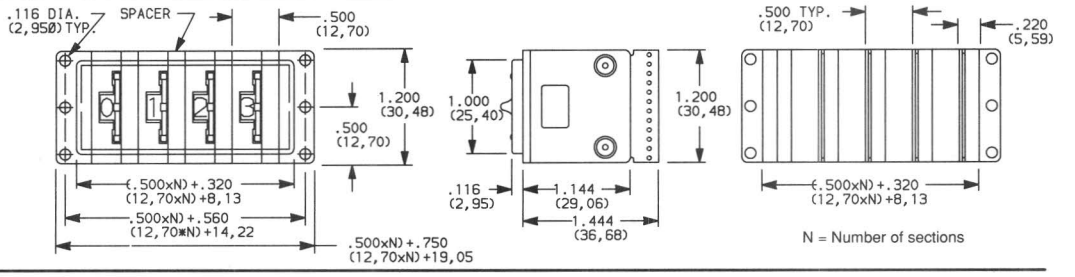
N = Number of sections

REAR MOUNTING

F

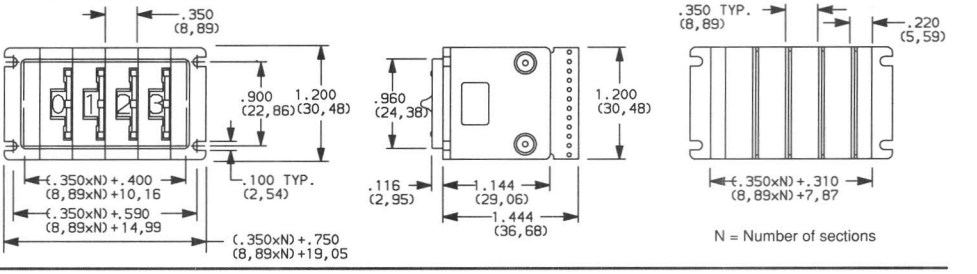
MOUNTING STYLES AND ASSEMBLY TYPES ILLUSTRATED

SECTION PITCH: .500 (12,70)
MOUNTING STYLE: 1
ASSEMBLY TYPE: 4



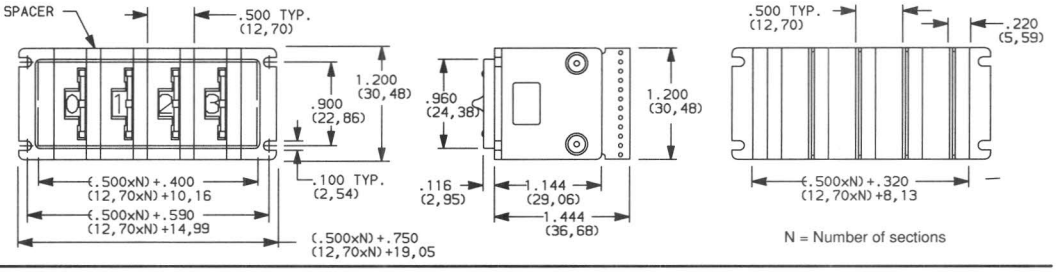
REAR MOUNTING

SECTION PITCH: .350 (8,89)
MOUNTING STYLE: 2
ASSEMBLY TYPE: 0



REAR MOUNTING

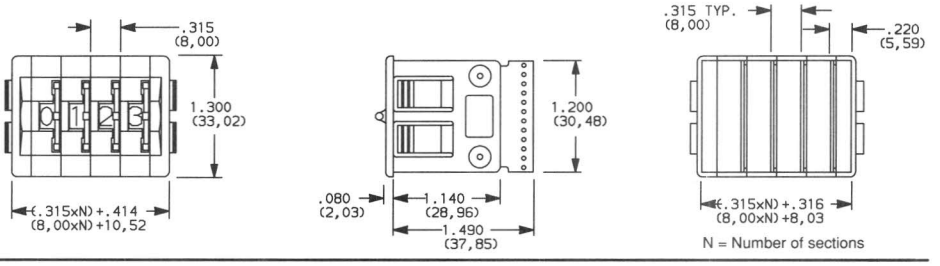
SECTION PITCH: .500 (12,70)
MOUNTING STYLE: 2
ASSEMBLY TYPE: 4



REAR MOUNTING

NEW

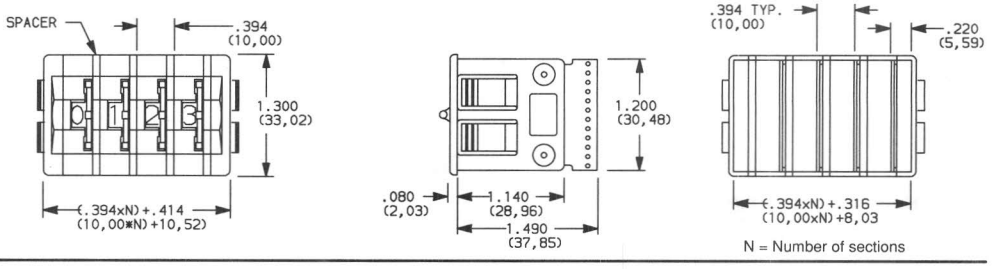
SECTION PITCH: .315 (8,00)
MOUNTING STYLE: 3
ASSEMBLY TYPE: 0



SNAP-IN FRONT MOUNTING

NEW

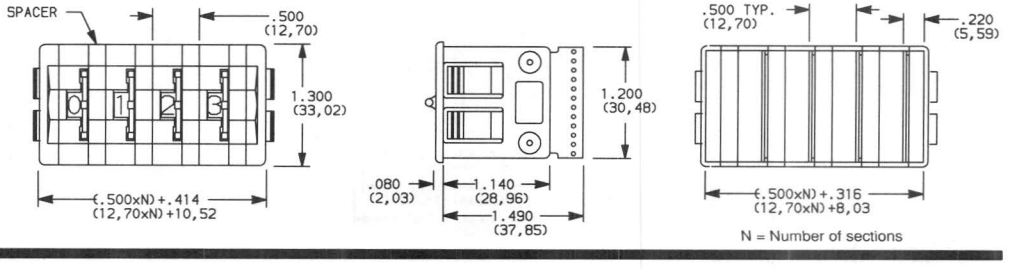
SECTION PITCH: 10mm
MOUNTING STYLE: 3
ASSEMBLY TYPE: 3



SNAP-IN FRONT MOUNTING

NEW

SECTION PITCH: .500 (12,70)
MOUNTING STYLE: 3
ASSEMBLY TYPE: 4



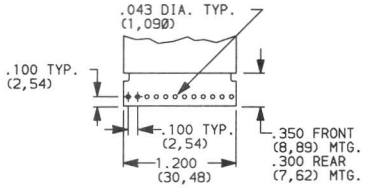
SNAP-IN FRONT MOUNTING

F

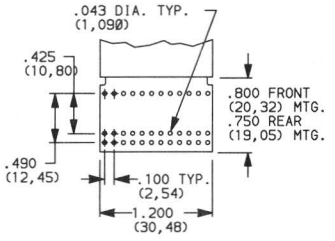
TERMINATIONS

Note: All terminal holes shown may not be present for all function codes, consult factory.

0 (STD.)



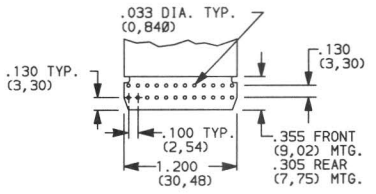
1



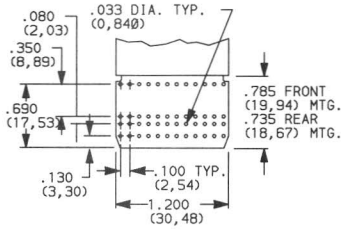
Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK.

4

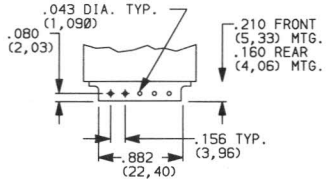


5



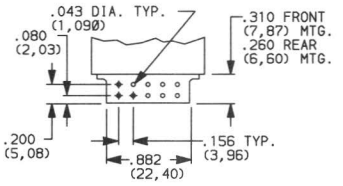
Signal traces cut except for common(s).

6

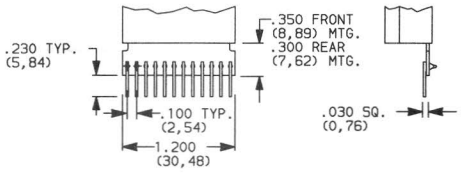


P.C. BOARD 1/32" (0,79) THK

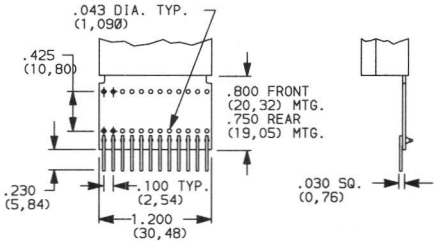
7



3 TYPE 0 WITH SOLDER PINS

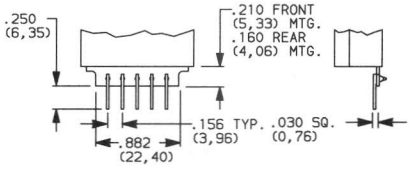


A TYPE 1 WITH SOLDER PINS



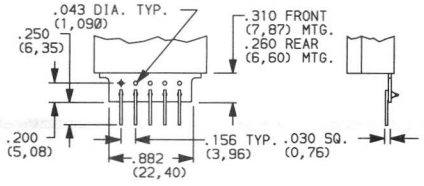
Signal traces cut except for common(s).

B TYPE 6 WITH SOLDER PINS

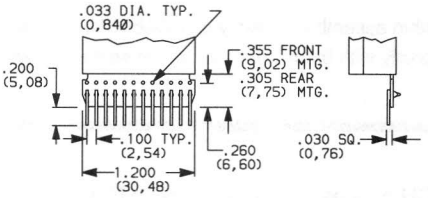


P.C. BOARD 1/32" (0,79) THK.

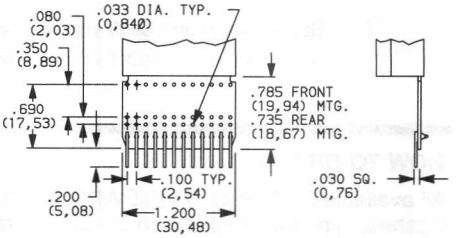
C TYPE 7 WITH SOLDER PINS



D TYPE 4 WITH SOLDERPINS



E TYPE 5 WITH SOLDER PINS



Signal traces cut except for common(s).

P.C. BOARD 1/32" (0,79) THK.

M SPECIAL TERMINATION

CONSULT FACTORY

9 ANY COMBINATION OF TERMINATION CONFIGURATIONS. ALSO USED WITH FUNCTION CODES 91 AND 92.

SPECIFY ON CONFIGURATION FORM, PAGE F-46 AND CONSULT FACTORY.

CONNECTOR

TERMINAL CONNECTOR AVAILABLE FOR TERMINATION OPTIONS 0, 1, 4, 5, SEE CATALOG SECTION H.

F

TERMINAL LOCATION NUMBERS



Fig. 1



Fig. 2

See function codes, pages F-36 thru F-39, for signal locations.

COLOR / MARKING / STOPS

0 (STD.) Matte black housing; Gloss black wheel with white characters, no stops.

1 Matte gray housing; Gloss black wheel with white characters, no stops.

9 Special color or markings for housing or wheel, stops, specify on CONFIGURATION FORM, page F-46 and consult factory. AVAILABLE COLORS: MARKING – White, Black.
BODY – Black, Gray (matte finish).
WHEEL – White, Black, Red, Orange, Yellow, Green, Blue, Brown, Gray (gloss finish).

Stop pins are available separately, see catalog section H.

SEAL

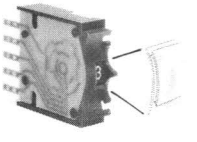
0 (Std.) Unsealed switching contacts.

1 Sealed switching contacts. Sealing is by means of an o-ring rotary seal and a cured-in-place elastomer gasket. Switching contact area is protected from moisture, oil, and airborne contaminants.

2 Dust lens. Protects the character face of the wheel from abrasion and dirt.

3 Sealed switching contacts and dust lens. (Options 1 and 2).

9 Sealing variations, section to section within assembly. Specify on CONFIGURATION FORM, page F-46 and consult factory. (Also specify with blank sections, where seal is not applicable).



DUST LENS

F

HOW TO ORDER

All available 3 SERIES THUMBWHEEL SWITCH options are listed on page F-35, and are described on pages F-36 thru F-44. Dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Use CONFIGURATION FORM, page F-46, for special instructions.

Endplates, blank sections, spacers and assembly hardware available separately, see catalog section H.

SPECIFICATIONS

CONTACT RATING:
CARRY: 1 AMP continuous.
SWITCH: 100 mA max.

OPERATING VOLTAGE: 50 mV to 28 V DC or 120 V AC.

ELECTRICAL LIFE: 10^5 detent operations between any two adjacent positions @ 25°C.

CONTACT RESISTANCE: Below 100 milliohms typ. initial @ 2-4 V DC, 100 mA.

INSULATION RESISTANCE: 10^9 ohms min.

DIELECTRIC STRENGTH: 500 V RMS min. @ sea level between common terminal and any output.

OPERATING TEMPERATURE: –10°C to 65°C.

MATERIALS

SWITCH BODY: ABS plastic.

THUMBWHEEL: ABS plastic.

ROTOR CONTACTS: Precious metal on copper alloy.

STATOR CONTACTS: Hard gold over nickel over 2 oz. copper on epoxy fiberglass.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

F

Configuration Form

GRAY SHADED AREAS TO BE FILLED IN BY C&K.

C&K CATALOG PART NO. 3 [ ][ ][ ][ ][ ][ ][ ][ ] — C&K PART NUMBER [ ][ ][ ][ ][ ]

C&K PART NUMBER [ ][ ][ ][ ][ ]

COMPANY NAME _____ REVISION: [ ]

ADDRESS _____ TEL.# _____

CUSTOMER CONTACT _____ DATE _____ DETAILS:

ORIGINATED BY _____ SALES REP. _____

THUMBWHEEL SECTIONS	NO. OF SEC.	FUNCTION CODE – TERMINATIONS – COLOR/MARKINGS/STOPS – SEAL ENTER OPTION CODES IN APPROPRIATE BOXES. FUNCTION CODES INCLUDE BLANK SECTIONS (SEE CATALOG PAGE F-39).	DESCRIBE IN APPROPRIATE ROW
1	1	3 – [ ][ ] – – [ ][ ][ ]	
2	2	3 – [ ][ ] – – [ ][ ][ ]	
3	3	3 – [ ][ ] – – [ ][ ][ ]	
4	4	3 – [ ][ ] – – [ ][ ][ ]	
5	5	3 – [ ][ ] – – [ ][ ][ ]	
6	6	3 – [ ][ ] – – [ ][ ][ ]	
7	7	3 – [ ][ ] – – [ ][ ][ ]	
8	8	3 – [ ][ ] – – [ ][ ][ ]	
9	9	3 – [ ][ ] – – [ ][ ][ ]	
0	10	3 – [ ][ ] – – [ ][ ][ ]	
1	11	3 – [ ][ ] – – [ ][ ][ ]	
2	12	3 – [ ][ ] – – [ ][ ][ ]	
3	13	3 – [ ][ ] – – [ ][ ][ ]	
4	14	3 – [ ][ ] – – [ ][ ][ ]	
5	15	3 – [ ][ ] – – [ ][ ][ ]	
6	16	3 – [ ][ ] – – [ ][ ][ ]	

FOR SWITCHES WITH MORE THAN 16 SECTIONS, CONTINUE ON ADDITIONAL SHEETS.

SPECIAL INSTRUCTIONS OR SPECIFICATIONS:

SHEET ____ OF ____

C&K COMPONENTS, INC. 15 Riverdale Ave. Newton, MA 02158-1082 Tel: (617) 964-6400, Telex: 92-2544, Fax: (617) 527-3062

SECTION G

ROTARY SWITCHES



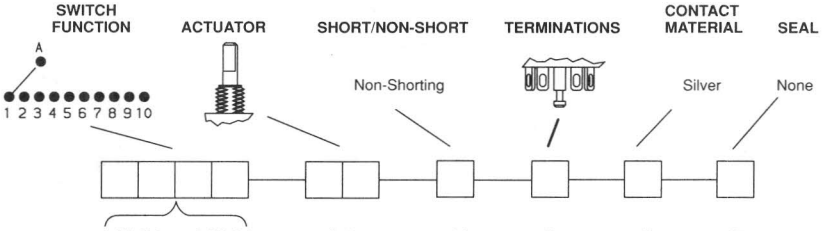
M Series ..... Half-Inch Rotary Switches ..... G-2 thru G-6





Easy Build-A-Switch:

Below is a complete listing of available options for M SERIES HALF-INCH ROTARY SWITCHES. Build-A-Switch allows you to mix and match options to create the switch you need – simply select desired option from each category. Switches with standard options are shown on page G-3; all available options are shown and described on pages G-4 thru G-6. When building a part number, dashes, hyphens or spaces in the part number are not significant, and are shown for clarity only. Complete HOW TO ORDER information is at the end of this section, page G-6. Hardware and accessories are available separately, see catalog section H.

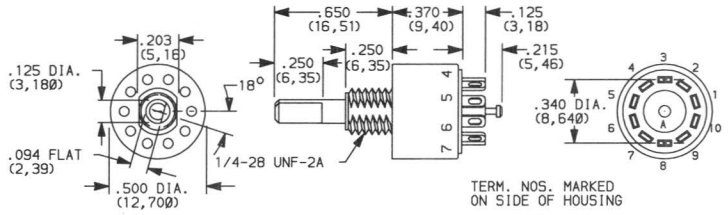


MA00	MD00	L1	N	C	G	D
MA02	MD02	L2	S	Z	Q	F
MA03	MD03	L3				
MA04	MD04					
MA05	MD05					
MA06	MD06					
MA07						
MA08						
MA09						
MA10						
MB00						
MB02						
MB03						
MB04						
MB05						
MC00						
MC02						
MC03						
MC04						
MC05						
MC06						
MC07						
MC08						
MC09						
MC10						
MC11						
MC12						

G

SWITCHES WITH STANDARD OPTIONS



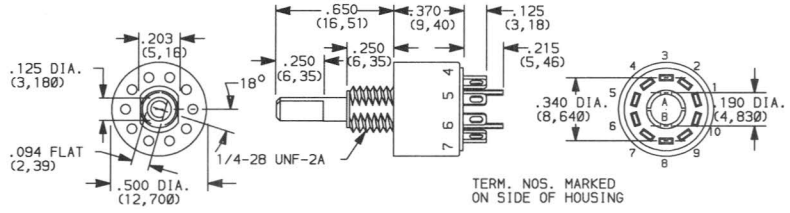


Actuator shown in pos. 1, fully CCW.

SP MODELS WITH 36° INDEXING

Part No. Shown: MA00L1NZQD



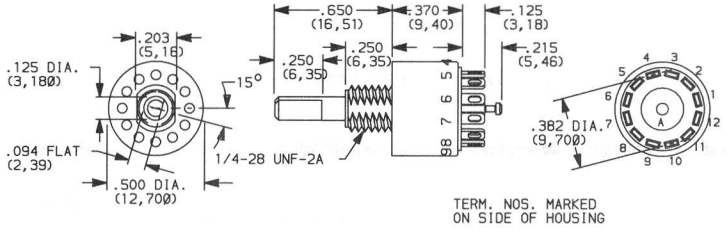


Actuator shown in pos. 1, fully CCW.

DP MODELS WITH 36° INDEXING

Part No. Shown: MB00L1NZQD



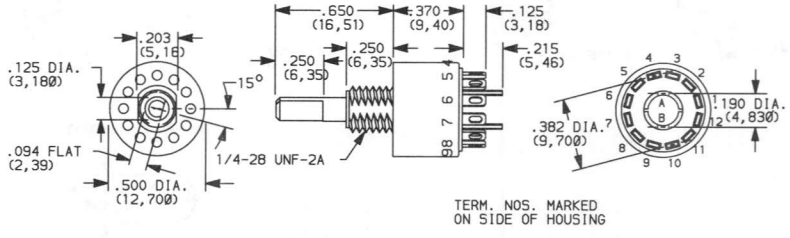


Actuator shown in pos. 1, fully CCW.

SP MODELS WITH 30° INDEXING

Part No. Shown: MC00L1NZQD





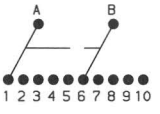
Actuator shown in pos. 1, fully CCW.

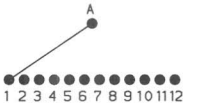
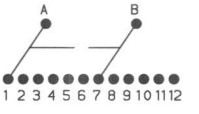
DP MODELS WITH 30° INDEXING

Part No. Shown: MD00L1NZQD

G

SWITCH FUNCTION

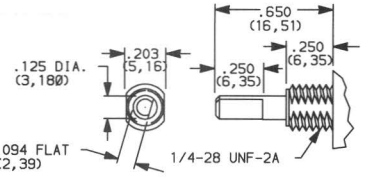
36° INDEXING			
NO. POLES	MODEL NO.	NO. POS.	SCHEMATIC
SP	MA00	10 – NO STOPS	
	MA02	2	
	MA03	3	
	MA04	4	
	MA05	5	
	MA06	6	
	MA07	7	
	MA08	8	
	MA09	9	
	MA10	10	
DP	MB00	5 – NO STOPS	
	MB02	2	
	MB03	3	
	MB04	4	
	MB05	5	

30° INDEXING			
NO. POLES	MODEL NO.	NO. POS.	SCHEMATIC
SP	MC00	12 – NO STOPS	
	MC02	2	
	MC03	3	
	MC04	4	
	MC05	5	
	MC06	6	
	MC07	7	
	MC08	8	
	MC09	9	
	MC10	10	
	MC11	11	
	MC12	12	
DP	MD00	6 – NO STOPS	
	MD02	2	
	MD03	3	
	MD04	4	
	MD05	5	
	MD06	6	

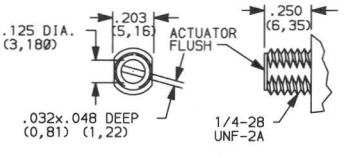
Number of positions or stops preset at factory (Note: MX00 models have full 360° rotation with no stops. Stop pins supplied for user-selectable stops).
All terminals present regardless of number of switch positions.

ACTUATOR

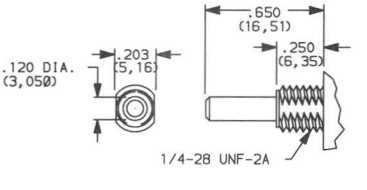
L1 (STD.)



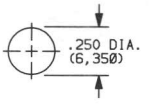
L2



L3



PANEL MOUNTING



Actuators shown in pos. 1.
Hardware: All models except MX00: One mounting nut and lockwasher supplied standard. MX00 models: Two stop pins, one adhesive mylar washer, mounting nut and lockwasher supplied standard. Hardware is available separately, see catalog section H.

SHORTING/NON-SHORTING CONTACTS

N (STD.)

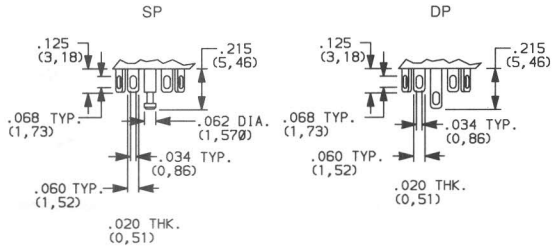
Non-Shorting contacts – break before make.

S

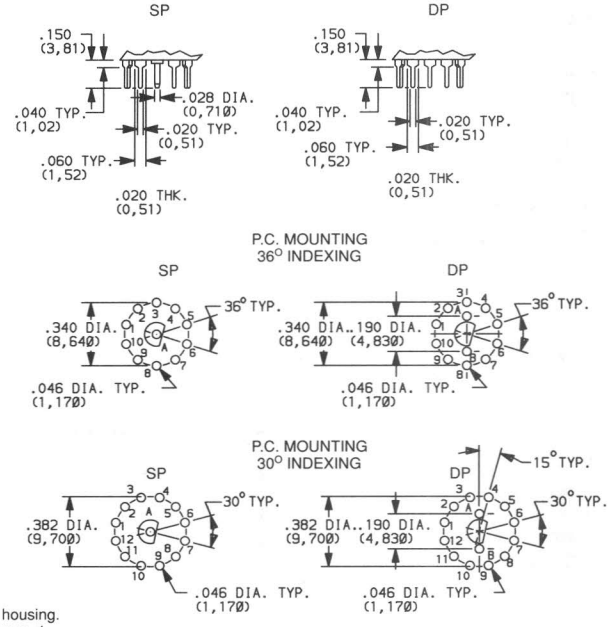
Shorting contacts – make before break.

TERMINATIONS

Z (STD.)



C



Q contact material std.
Terminal numbers marked on side of housing.
Actuators and schematics shown in pos. 1.
All terminals insert molded.
All terminals present regardless of number of switch positions.

CONTACT MATERIAL

OPTION CODE	CONTACT MATERIAL	TERMINAL PLATING	RATINGS	
Q	SILVER [1, 2]	SILVER [2]	POWER	CARRY: 6 AMPS CONTINUOUS. SWITCH: 250 mA @ 125 V AC OR 28 V DC.
G	GOLD OVER SILVER [3,4]	GOLD [4]	LOW LEVEL/ DRY CIRCUIT OR POWER	0.4 VA MAX @ 20 V AC OR DC MAX. OR, CARRY: 6 AMPS CONTINUOUS. SWITCH: 250 mA @ 125 V AC OR 28 V DC.

CONTACT MATERIAL/APPLICATION RECOMMENDATIONS – SEE CHART, PAGE X.

[1] MOVABLE CONTACTS: Non-shorting: Copper alloy, silver plated.
Shorting: Zinc alloy, silver plated.
[2] STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, silver plated.
[3] MOVABLE CONTACTS: Non-shorting: Copper alloy, with gold plate over nickel plate over silver plate.
Shorting: Zinc alloy, with gold plate over nickel plate over silver plate.
[4] STATIONARY CONTACTS & ALL TERMINALS: Copper alloy, with gold plate over nickel plate over silver plate.

Q contact material std. with all terminations.

G

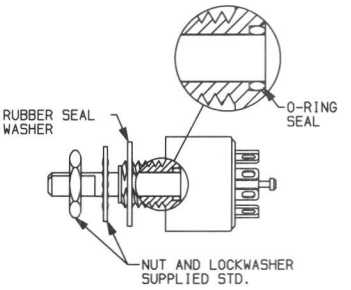
SEAL

D (STD.)

No seal – std.

F

SPLASHPROOF SHAFT AND PANEL SEAL



HOW TO ORDER

All available M SERIES HALF-INCH ROTARY SWITCH options are listed on page G-2, and are described on pages G-3 thru G-6. Switches with standard options are shown on page C-3. When selecting options and building a part number, dashes, hyphens or spaces in the part number are not significant and are shown for clarity only. Hardware and accessories are available separately, see catalog section H.

Note: Number of positions or stops are pre-set at factory. MX00 models have full 360^0 rotation with no stops. Stop pins are supplied with these models for user-selectable stops. See setting stops, below, for installation instructions.

SPECIFICATIONS

CONTACT RATING:
CARRY: 6 AMPS continuous (Q contact mat'l).
SWITCH: 250 mA max. @ 125 V AC or 28 V DC (Q contact mat'l.). Non-shorting contacts std.
ELECTRICAL LIFE: 10,000 make-and-break cycles at 150 mA, 125 V AC or 28 V DC. One cycle=full 360^0 rotation CW, then CCW.
CONTACT RESISTANCE: Below 20 milliohms typ. initial @ 2-4 V DC, 100 mA, for both silver and gold plated contacts.
INSULATION RESISTANCE: 10^{10} ohms min.
DIELECTRIC STRENGTH: 600 V RMS min. @ sea level.
OPERATING TEMPERATURE: -30^{0}C to 85^{0}C.
STOP STRENGTH: 7.5 pound-inches min.
OPERATING FORCE: 4-7 ounce-inches typ. initial.
SOLDERABILITY: Per mil std. 202F method 208D, or EIA RS-186E method 9 (1 hr. steam aging).

MATERIALS

HOUSING AND BUSHING: Zinc alloy, bright zinc plated, with clear chromate finish.
ACTUATOR: Zinc alloy, nickel plated.
BASE: Diallyl phthalate (DAP) or melamine phenolic, with insert molded terminals.
ROTOR: Glass filled polyester (UL 94V-0).
MOVABLE CONTACTS:
Non-shorting: Copper alloy, silver plated (Q contact mat'l).
Shorting: Zinc alloy, silver plated (Q contact mat'l.).
STATIONARY CONTACT & ALL TERMINALS: Copper alloy, silver plated (Q contact mat'l). All terminals insert molded. All terminals present regardless of number of switch positions.
CONTACT SPRING: Music wire, phosphate coated.
STOP PIN: Stainless steel.
HARDWARE: Nut – Brass, nickel plated.
Lockwasher – Steel, nickel plated.

Note: Specifications and materials listed above are general specifications. Specifications available for specific and custom switches, consult factory.

SETTING STOPS

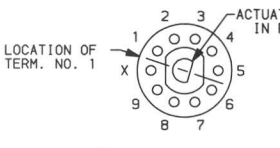
MX00 MODELS ONLY:

The number of switch positions or stops is adjustable by means of stop pins provided with each switch. Switches are normally shipped with stop pins and hardware in bulk, not installed. Without stop pins, switches have full 360^O rotation and no stops. Note that all two pole models begin to repeat when actuated 180^O or more.

To set stops, refer to figs. 1 & 2. Orient switch so that terminal no. 1 is as shown. Turn actuator to pos. 1, using flats on bushing and terminal no. 1 as reference. Install CCW stop pin in hole designated 'X'. Install second stop pin in hole number corresponding to the number of positions desired. Note that two pole models will begin to repeat when actuated 180^O or more. To retain stop pins, use adhesive mylar washer included; see fig. 3.

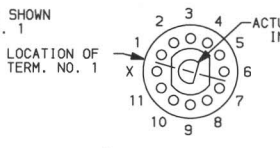
ALL OTHER MODELS:

All models except MX00 models have number of switch positions or stops pre-set at factory and are not adjustable.



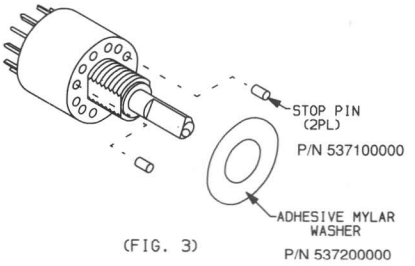
36° INDEXING MODELS
TOP VIEW

(FIG. 1)



30° INDEXING MODELS
TOP VIEW

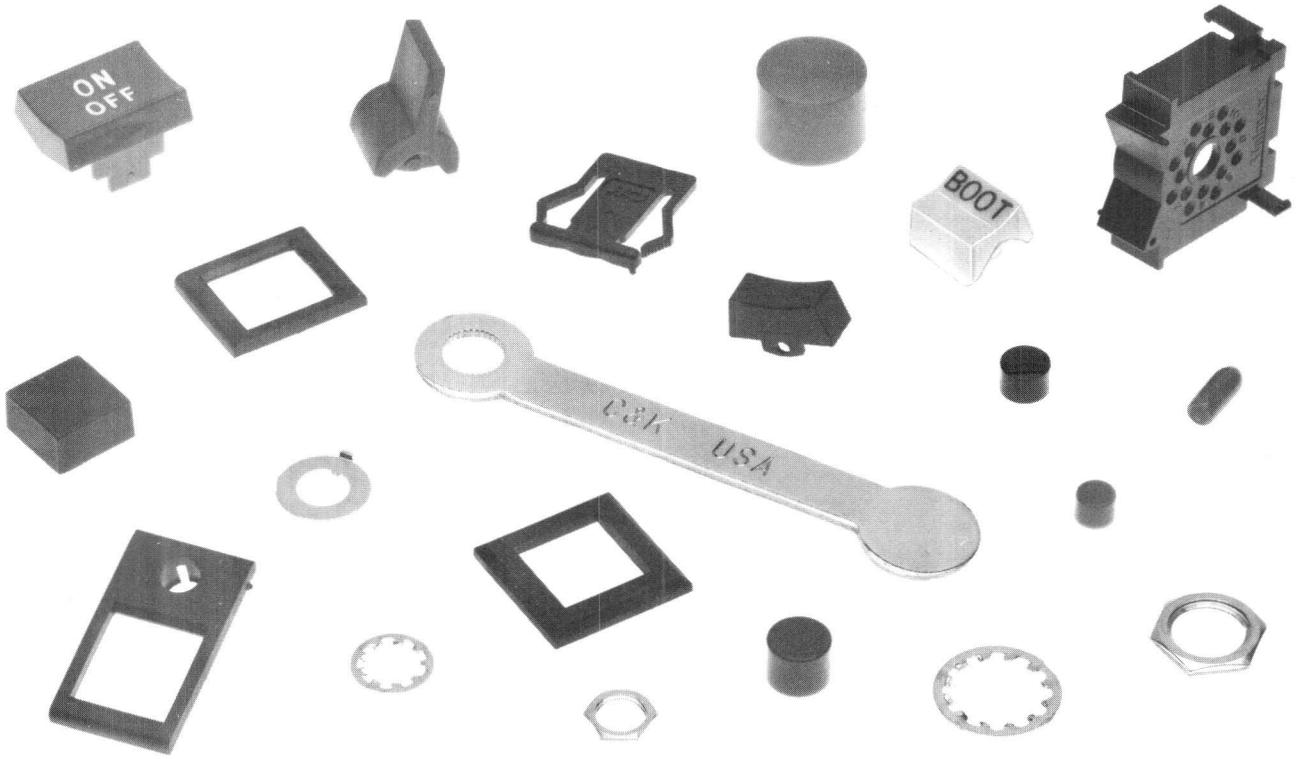
(FIG. 2)



(FIG. 3)

SECTION H

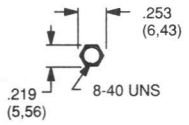
HARDWARE AND ACCESSORIES



Hardware – Panel Mounted Switches . . . . . H-2 thru H-6
Actuators – Rocker and Lever Handle Switches . . . . . H-6 thru H-8
Frames – Rocker, Lever Handle, Pushbutton Switches . . . . . H-9 thru H-10
Caps – Pushbutton Switches . . . . . H-11 thru H-12
Endplates, Spacers, Blank Sections, Hardware – Coded Switches . . . . . H-13 thru H-18
Miscellaneous H-18

HEX NUTS

8-40 THD.



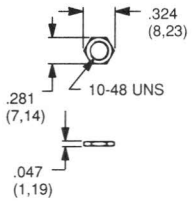
PART NO.

775200201 NICKEL PLATED
775200264 BLACK

FOR SERIES

8600

10-48 THD.



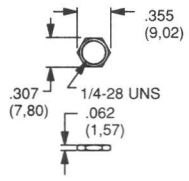
PART NO.

464900201 NICKEL PLATED
464900264 BLACK

FOR SERIES

T, TP

1/4-28 THD.



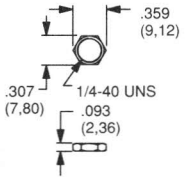
PART NO.

477100201 NICKEL PLATED

FOR SERIES

M

1/4-40 THD.



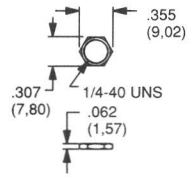
PART NO.

540400201 NICKEL PLATED
540400264 BLACK

FOR SERIES

E, E010

1/4-40 THD.



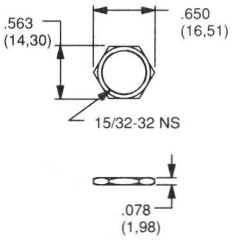
PART NO.

700201201 NICKEL PLATED
700201264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, T, TP

15-32 THD.



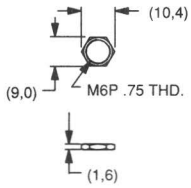
PART NO.

707100201 NICKEL PLATED
707100215 SATIN CHROME
707100264 BLACK

FOR SERIES

7000, 8500, 9000

METRIC



PART NO.

791600201 NICKEL PLATED
791600264 BLACK

FOR SERIES

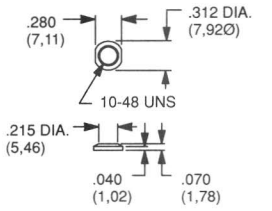
7000, 8020, 8060

MATERIAL

Brass, nickel plated std. Other finishes, consult factory.

DRESS NUTS

10-48 THD.



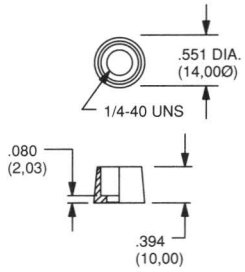
PART NO.

465701201 NICKEL PLATED
465701264 BLACK

FOR SERIES

T, TP

1/4-40 THD.



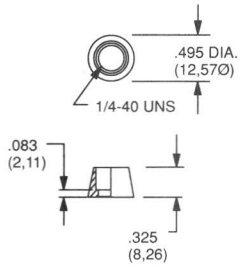
PART NO.

580700201 NICKEL PLATED

FOR SERIES

8020, 8060, 8500, TP

1/4-40 THD.



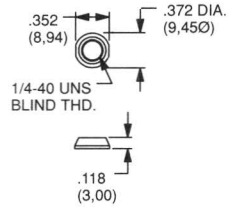
PART NO.

702501201 NICKEL PLATED
702501264 BLACK

FOR SERIES

8020, 8060, E010, TP

1/4-40 THD. – BLIND



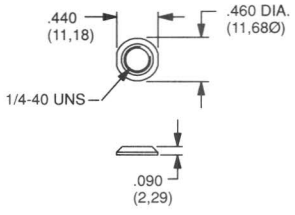
PART NO.

709901201 NICKEL PLATED
709901215 SATIN CHROME
709901264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

1/4-40 THD.



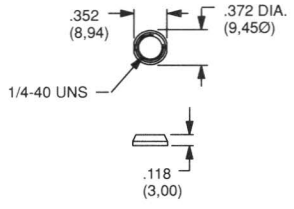
PART NO.

776001201 NICKEL PLATED
776002231 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

1/4-40 THD.



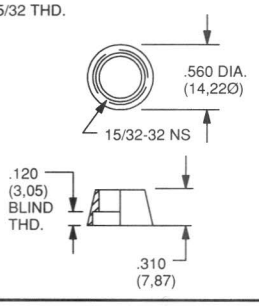
PART NO.

780701201 NICKEL PLATED
780701215 SATIN CHROME
780701264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

15/32 THD.



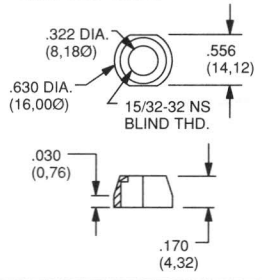
PART NO.

498800201 NICKEL PLATED

FOR SERIES

8500

15/32 THD. – BLIND



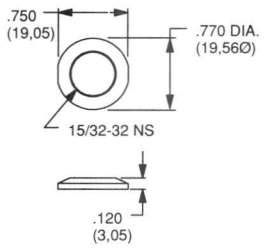
PART NO.

605300201 NICKEL PLATED

FOR SERIES

7000 (T2P ACTUATOR OPTION ONLY)

15/32 THD.



PART NO.

895101201 NICKEL PLATED
895101264 BLACK

FOR SERIES

7000, 8500, 9000

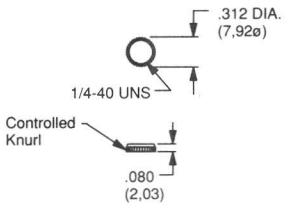
MATERIAL

Brass, nickel plated std. Other finishes, consult factory.

H

KNURLED NUTS

1/4-40 THD. – BLIND



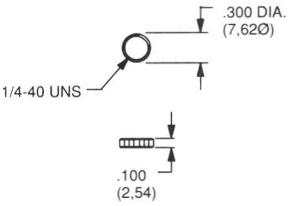
PART NO.

778000201 NICKEL PLATED
778000264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, T, TP

1/4-40 THD.



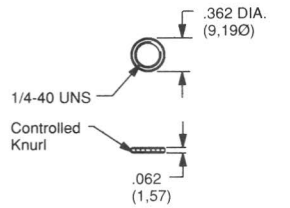
PART NO.

778600201 NICKEL PLATED
778600224 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, E, E010, T, TP

1/4-40 THD. – (FITS GULMITE #12 SOCKET)



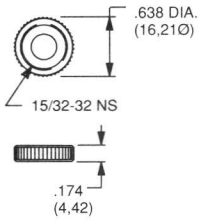
PART NO.

796901201 NICKEL PLATED
796901264 BLACK

FOR SERIES

7000, 8020, 8060, 8500, 9000, T, TP

15/32 THD.



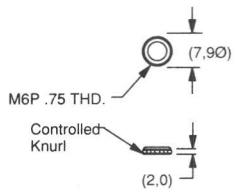
PART NO.

471300201 NICKEL PLATED
471300264 BLACK

FOR SERIES

7000, 8500, 9000

METRIC



PART NO.

483200201 NICKEL PLATED

FOR SERIES

7000, 8020, 8060

MATERIAL

Brass, nickel plated std. Other finishes, consult factory.

WRENCHES



PART NO.

465300201

FITS NUT PART NUMBERS

4649XXXXX, 4657XXXXX



PART NO.

481500201

FITS NUT PART NUMBERS

7780XXXXX, 4832XXXXX



PART NO.

778500201

FITS NUT PART NUMBERS

7002XXXXX, 7099XXXXX
7807XXXXX, 7916XXXXX



PART NO.

894200201

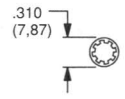
FITS NUT PART NUMBERS

7969XXXXX

H

LOCKWASHERS

FITS 10-48 BUSHING

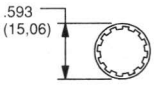


.018 THK.
(0,46)

PART NO.

465200202 NICKEL PLATED

FITS 15/32 BUSHING

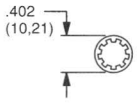


.021 THK.
(0,53)

PART NO.

700302202 NICKEL PLATED
700302264 BLACK

FITS 1/4-40 BUSHING



.018 THK.
(0,46)

PART NO.

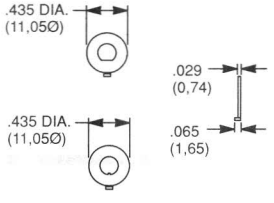
700303202 NICKEL PLATED
700303264 BLACK

MATERIAL

Steel, nickel plated std. Other finishes, consult factory.

LOCKING RINGS

FITS 10-48 BUSHING



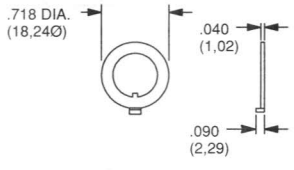
PART NO.

465000201 NICKEL PLATED – FLAT

PART NO.

465101201 NICKEL PLATED – KEYWAY

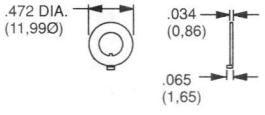
FITS 15/32 BUSHING



PART NO.

707200201 NICKEL PLATED – KEYWAY
707200264 BLACK – KEYWAY

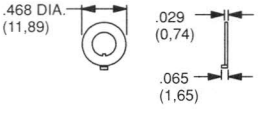
FITS METRIC BUSHING



PART NO.

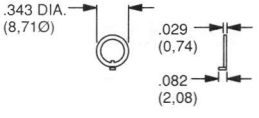
791800201 NICKEL PLATED – KEYWAY
791800264 BLACK – KEYWAY

FITS 1/4-40 BUSHING



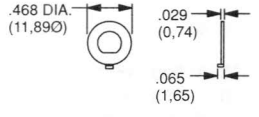
PART NO.

700701201 NICKEL PLATED – KEYWAY
700701264 BLACK – KEYWAY



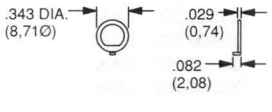
PART NO.

753700201 NICKEL PLATED – SMALL KEYWAY
753700264 BLACK – SMALL KEYWAY



PART NO.

757200201 NICKEL PLATED – FLAT
757200264 BLACK – FLAT



PART NO.

757300201 NICKEL PLATED – SMALL FLAT
757300264 BLACK – SMALL FLAT

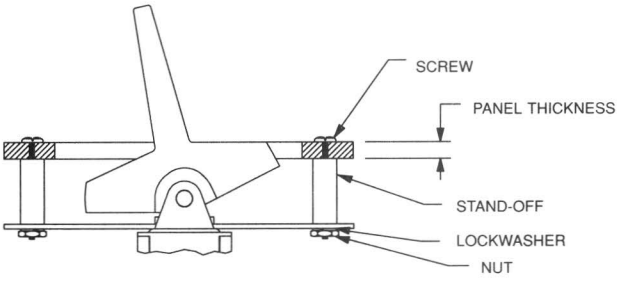
MATERIAL

Brass, nickel plated std. Other finishes, consult factory.

H

ROCKER AND LEVER HANDLE SWITCH – PANEL MOUNTING HARDWARE

Panel mounting hardware for rocker and lever handle switches is available separately. Mounting hardware consists of two screws, two nuts, two standoffs and two lockwashers per switch, and is available for panel thicknesses of 1/16, 3/32 and 1/8 in. See part nos. below.



FOR J1, J2, J54, J64, J94 ACTUATORS – 7000 & E SERIES
FOR J1, J6 ACTUATORS – T SERIES

PART NO.	PANEL THK.	STANDOFF LENGTH
761101000	1/16 IN. (1,59)	.295 (7,49)
761102000	3/32 IN. (2,38)	.264 (6,71)
761103000	1/8 IN. (3,18)	.233 (5,92)

FOR J1, J2, J3, J50, J60, J90 ACTUATORS – 9000 SERIES
FOR J3 ACTUATORS – 7000 SERIES

PART NO.	PANEL THK.	STANDOFF LENGTH
770601000	1/16 IN. (1,59)	.295 (7,49)
770602000	3/32 IN. (2,38)	.264 (6,71)
770603000	1/8 IN. (3,18)	.233 (5,92)

FOR J4, J5 ACTUATORS – 7000 & 9000 SERIES

PART NO.	PANEL THK.	STANDOFF LENGTH
775001000	1/16 IN. (1,59)	.375 (9,53)
775002000	3/32 IN. (2,38)	.344 (8,74)
775003000	1/8 IN. (3,18)	.312 (7,92)

FOR J10 ACTUATOR – 7000 & 9000 SERIES

PART NO.	PANEL THK.	STANDOFF LENGTH
770701000	1/16 IN. (1,59)	.295 (7,49)
770702000	3/32 IN. (2,38)	.264 (6,71)
770703000	1/8 IN. (3,18)	.233 (5,92)

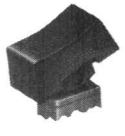
MATERIAL

Screws, nuts, lockwashers: Stainless steel. Standoffs: Nylon, std. Aluminum available, consult factory.

ROCKER AND LEVER HANDLE ACTUATORS

Special colors, custom marking available, consult factory.

J1



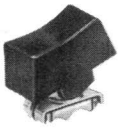
PART NO.	
538501000	WHITE
538502263	BLACK
538503000	RED
538504000	ORANGE
538505000	YELLOW
538506000	GREEN
538507000	BLUE
538508000	BROWN
538509000	GRAY

FOR SERIES

ET

Material: Nylon. Finish: Matte.

J1



PART NO.	
468001000	WHITE
468002263	BLACK
468003000	RED
468004000	ORANGE
468005000	YELLOW
468006000	GREEN
468007000	BLUE
468008000	BROWN
468009000	GRAY

FOR SERIES

T

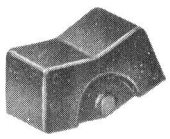
Material: Nylon. Finish: Matte.

H

ROCKER AND LEVER HANDLE ACTUATORS

Special colors, custom markings available, consult factory.

J1, J11, J15, J16



PART NO.

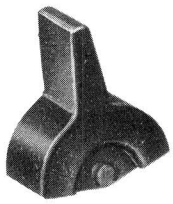
760201000	WHITE
760202263	BLACK
760203000	RED
760204000	ORANGE
760205000	YELLOW
760206000	GREEN
760207000	BLUE
760208000	BROWN
760209000	GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J2, J21, J25, J26



PART NO.

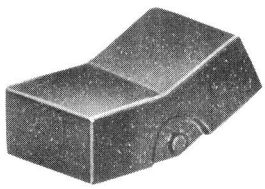
760501000	WHITE
760502263	BLACK
760503000	RED
760504000	ORANGE
760505000	YELLOW
760506000	GREEN
760507000	BLUE
760508000	BROWN
760509000	GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J3, J37



PART NO.

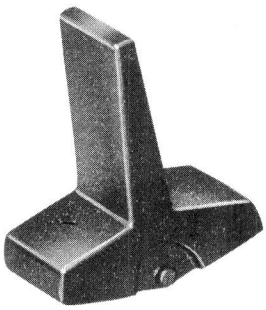
766601000	WHITE
766602263	BLACK
766603000	RED
766604000	ORANGE
766605000	YELLOW
766606000	GREEN
766607000	BLUE
766608000	BROWN
766609000	GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J4, J47



PART NO.

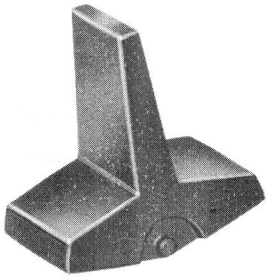
773301000	WHITE
773302263	BLACK
773303000	RED
773304000	ORANGE
773305000	YELLOW
773306000	GREEN
773307000	BLUE
773308000	BROWN
773309000	GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J5, J57



PART NO.

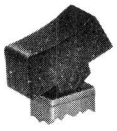
791201000	WHITE
791202263	BLACK
791203000	RED
791204000	ORANGE
791205000	YELLOW
791206000	GREEN
791207000	BLUE
791208000	BROWN
791209000	GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J6



PART NO.

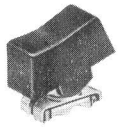
538401000	WHITE
538402263	BLACK
538403000	RED
538404000	ORANGE
538405000	YELLOW
538406000	GREEN
538407000	BLUE
538408000	BROWN
538409000	GRAY

FOR SERIES

ET

Material: Nylon. Finish: Matte.

J6



PART NO.

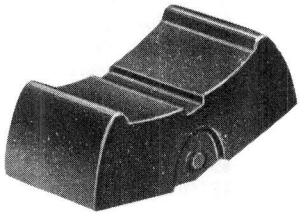
468101000	WHITE
468102263	BLACK
468103000	RED
468104000	ORANGE
468105000	YELLOW
468106000	GREEN
468107000	BLUE
468108000	BROWN
468109000	GRAY

FOR SERIES

T

Material: Nylon. Finish: Matte.

J10, J19



PART NO.

769501000	WHITE
769502263	BLACK
769503000	RED
769504000	ORANGE
769505000	YELLOW
769506000	GREEN
769507000	BLUE
769508000	BROWN
769509000	GRAY

FOR SERIES

7000, 9000

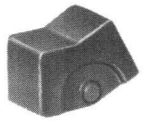
Material: Nylon. Finish: Matte.

H

ROCKER AND LEVER HANDLE ACTUATORS

Special colors, custom markings available, consult factory.

J50, J51, J52, J53, J54



PART NO.

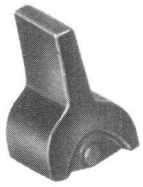
628301000	WHITE
628302263	BLACK
628303000	RED
628304000	ORANGE
628305000	YELLOW
628306000	GREEN
628307000	BLUE
628308000	BROWN
628309000	GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J60, J61, J62, J63, J64



PART NO.

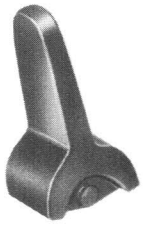
613801000	WHITE
613802263	BLACK
613803000	RED
613804000	ORANGE
613805000	YELLOW
613806000	GREEN
613807000	BLUE
613808000	BROWN
613809000	GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

J90, J91, J92, J93, J94



PART NO.

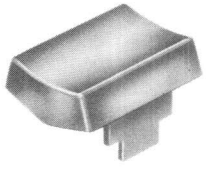
598001000	WHITE
598002263	BLACK
598003000	RED
598004000	ORANGE
598005000	YELLOW
598006000	GREEN
598007000	BLUE
598008000	BROWN
598009000	GRAY

FOR SERIES

7000, 9000, E

Material: Nylon. Finish: Matte.

5000 SERIES ROCKER

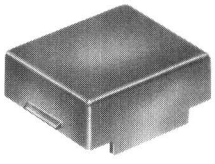


PART NO.

792201000	WHITE
792203000	RED
792204000	ORANGE
792205000	YELLOW
792206000	GREEN

Material: Translucent polycarbonate. Finish: Gloss.

5600 SERIES LENS



PART NO.

795201000	WHITE
795203000	RED
795204000	ORANGE
795205000	YELLOW
795206000	GREEN

Material: Translucent polycarbonate. Finish: Gloss.

L41



PART NO.

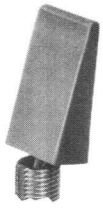
481001000	WHITE
481002263	BLACK
481003000	RED
481004000	ORANGE
481005000	YELLOW
481006000	GREEN
481007000	BLUE
481008000	BROWN
481009000	GRAY

FOR SERIES

7000, 9000

Material: Nylon. Finish: Matte.

L42



PART NO.

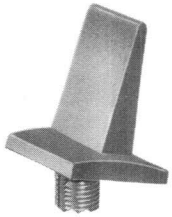
481101000	WHITE
481102263	BLACK
481103000	RED
481104000	ORANGE
481105000	YELLOW
481106000	GREEN
481107000	BLUE
481108000	BROWN
481109000	GRAY

FOR SERIES

7000, 9000

Material: Nylon. Finish: Matte.

L43



PART NO.

481201000	WHITE
481202263	BLACK
481203000	RED
481204000	ORANGE
481205000	YELLOW
481206000	GREEN
481207000	BLUE
481208000	BROWN
481209000	GRAY

FOR SERIES

7000, 9000

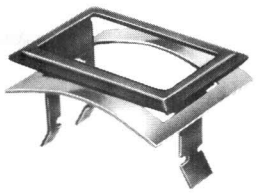
Material: Nylon. Finish: Matte.

H

FRAMES

Special colors, custom markings available, consult factory.

FOR J11, J21 ACTUATORS



Material: Spring Steel.

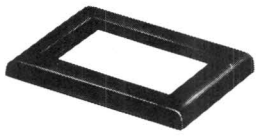
PART NO.

764500223	BRIGHT CHROME
764500252	SATIN CHROME
764500746	BLACK ENAMEL
764500747	WHITE ENAMEL

FOR SERIES

7000

FOR J16, J26 ACTUATORS



Material: Nylon. Finish: Matte.

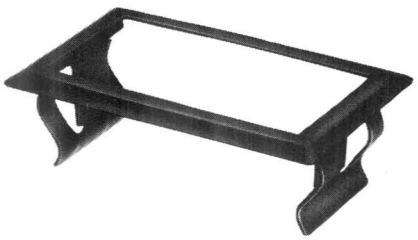
PART NO.

459101000	WHITE
459102000	BLACK
459103000	RED
459104000	ORANGE
459105000	YELLOW
459106000	GREEN
459107000	BLUE
459108000	BROWN
459109000	GRAY

FOR SERIES

7000

FOR J19 ACTUATOR



Material: Spring Steel.

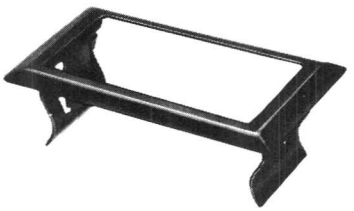
PART NO.

781000223	BRIGHT CHROME
781000252	SATIN CHROME
781000746	BLACK ENAMEL
781000747	WHITE ENAMEL

FOR SERIES

7000, 9000

FOR J37, 47, 57 ACTUATORS



Material: Spring Steel.

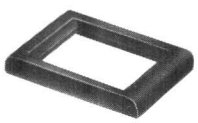
PART NO.

445400747	WHITE ENAMEL
445400223	BRIGHT CHROME
445400252	SATIN CHROME
445400746	BLACK ENAMEL

FOR SERIES

7000, 9000

FOR J51, J61, J81, J83, J85, J86, J91 ACTUATORS



Material: Nylon. Finish: Matte.

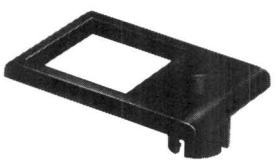
PART NO.

615601000	WHITE
615602263	BLACK
615603000	RED
615604000	ORANGE
615605000	YELLOW
615606000	GREEN
615607000	BLUE
615608000	BROWN
615609000	GRAY

FOR SERIES

7000

FOR J52, J62, J82, J84, J92 ACTUATORS



Material: Nylon. Finish: Matte.

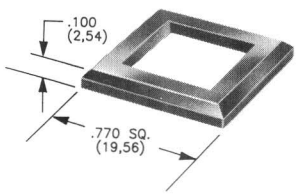
PART NO.

613301000	WHITE
613302263	BLACK
613303000	RED
613304000	ORANGE
613305000	YELLOW
613306000	GREEN
613307000	BLUE
613308000	BROWN
613309000	GRAY

FOR SERIES

7000

SQUARE FRAME



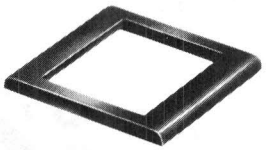
Material: Nylon. Finish: Matte or Gloss.

MATTE FINISH PART NO.	GLOSS FINISH PART NO.	
486701000	486801000	WHITE
486702000	486802000	BLACK
486703000	486803000	RED
486704000	486804000	ORANGE
486705000	486805000	YELLOW
486706000	486806000	GREEN
486707000	486807000	BLUE
486708000	486808000	BROWN
486709000	486809000	GRAY

FITS

FOR J50, J60, J80, J83, J85, J90 ACTUATORS

5000 & 5600 SERIES FRAME



Material: Nylon. Finish: Matte.

PART NO.

788801000	WHITE
788802000	BLACK
788803000	RED
788804000	ORANGE
788805000	YELLOW
788806000	GREEN
788807000	BLUE
788808000	BROWN
788809000	GRAY

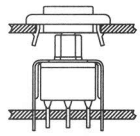
H

SEPARATE SNAP-IN FRAMES

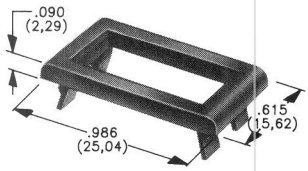
Special colors, custom markings available, consult factory.

SEPARATE SNAP-IN FRAMES

Frames snap into panel opening and are independent from switch mounting. Accurate positioning of the P.C. mounted switch relative to the panel opening is necessary to provide proper clearance between actuator and frame. Available in two basic styles and for four panel thicknesses .047 – .125 in. Material: Nylon. Finish: Matte.



FOR J1, J2 ACTUATORS

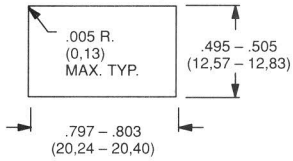


FOR SERIES

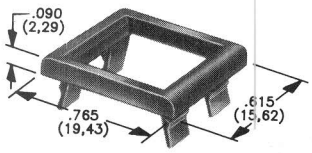
7000, E

.047 (1,19) PANEL THK. PART NO.	.062 (1,57) PANEL THK. PART NO.	.090 (2,29) PANEL THK. PART NO.	.125 (3,18) PANEL THK. PART NO.	COLOR
452601000	452701000	452801000	452901000	WHITE
452602263	452702263	452802263	452902263	BLACK
452603000	452703000	452803000	452903000	RED
452604000	452704000	452804000	452904000	ORANGE
452605000	452705000	452805000	452905000	YELLOW
452606000	452706000	452806000	452906000	GREEN
452607000	452707000	452807000	452907000	BLUE
452608000	452708000	452808000	452908000	BROWN
452609000	452709000	452809000	452909000	GRAY

PANEL MOUNTING



FOR J50, J60, J80, J90 ACTUATORS

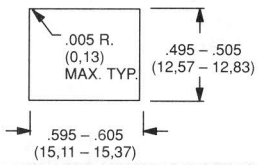


FOR SERIES

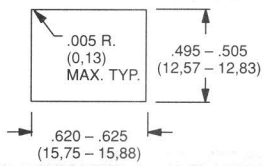
7000, E, 8020, 8060, 8500, E010, E020, TP

.047 (1,19) PANEL THK. PART NO.	.062 (1,57) PANEL THK. PART NO.	.090 (2,29) PANEL THK. PART NO.	.125 (3,18) PANEL THK. PART NO.	COLOR
432501000	432601000	432701000	432801000	WHITE
432502263	432602263	432702263	432802263	BLACK
432503000	432603000	432703000	432803000	RED
432504000	432604000	432704000	432804000	ORANGE
432505000	432605000	432705000	432805000	YELLOW
432506000	432606000	432706000	432806000	GREEN
432507000	432607000	432707000	432807000	BLUE
432508000	432608000	432708000	432808000	BROWN
432509000	432609000	432709000	432809000	GRAY

PANEL MOUNTING – 4325, 4326

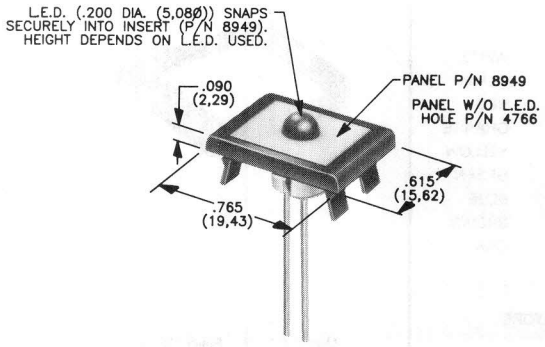


PANEL MOUNTING – 4327, 4328



PANEL INSERTS (WILL FIT SEPARATE SNAP-IN FRAMES FOR J50, J60, J90 ACTUATORS)

Above frames (part nos. 432XXXXXX) are also available with insert which accepts LED for indicator light assembly. Order insert separately from frame. Blank insert panel (without hole for LED) also available. LED not included, see page IX for LED information and recommendations.



PANEL INSERT WITH HOLE FOR LED PART NO.	BLANK PANEL INSERT WITHOUT HOLE FOR LED PART NO.	COLOR
476601000	894901000	WHITE
476602000	894902000	BLACK
476603000	894903000	RED
476604000	894904000	ORANGE
476605000	894905000	YELLOW
476606000	894906000	GREEN
476607000	894907000	BLUE
476608000	894908000	BROWN
476609000	894909000	GRAY
FOR SERIES	FOR SERIES	
7000	7000	

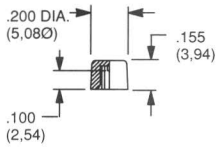
H

PUSHBUTTON CAPS

Special colors, custom marking available, consult factory. Material: Nylon. Finish: Round caps – gloss, Square caps – matte or gloss.

FOR .100 DIA. PLUNGERS





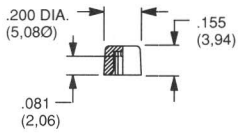
PART NO.

508101000	WHITE
508102000	BLACK
508103000	RED
508104000	ORANGE
508105000	YELLOW
508106000	GREEN
508107000	BLUE
508108000	BROWN
508109000	GRAY

FOR SERIES

ET, TP





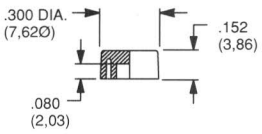
PART NO.

538701000	WHITE
538702000	BLACK
538703000	RED
538704000	ORANGE
538705000	YELLOW
538706000	GREEN
538707000	BLUE
538708000	BROWN
538709000	GRAY

FOR SERIES

TP (RECOMMENDED FOR S9 PLUNGER OPTION)





PART NO.

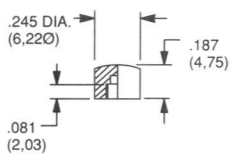
465801000	WHITE
465802000	BLACK
465803000	RED
465804000	ORANGE
465805000	YELLOW
465806000	GREEN
465807000	BLUE
465808000	BROWN
465809000	GRAY

FOR SERIES

ET, TP

FOR .106 DIA. PLUNGERS





PART NO.

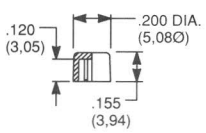
785101000	WHITE
785102000	BLACK
785103000	RED
785104000	ORANGE
785105000	YELLOW
785106000	GREEN
785107000	BLUE
785108000	BROWN
785109000	GRAY

FOR SERIES

8600

FOR .122 DIA. PLUNGERS





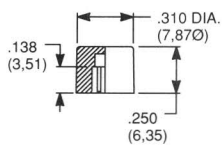
PART NO.

708901000	WHITE
708902000	BLACK
708903000	RED
708904000	ORANGE
708905000	YELLOW
708906000	GREEN
708907000	BLUE
708908000	BROWN
708909000	GRAY

FOR SERIES

8020, 8060, E010, E020, TP





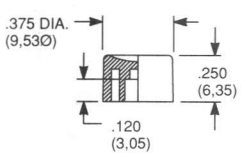
PART NO.

801801000	WHITE
801802000	BLACK
801803000	RED
801804000	ORANGE
801805000	YELLOW
801806000	GREEN
801807000	BLUE
801808000	BROWN
801809000	GRAY

FOR SERIES

8020, 8060, E010, E020, TP



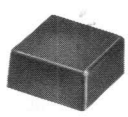


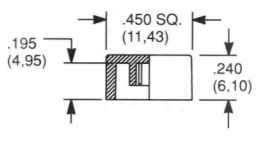
PART NO.

752701000	WHITE
752702000	BLACK
752703000	RED
752704000	ORANGE
752705000	YELLOW
752706000	GREEN
752707000	BLUE
752708000	BROWN
752709000	GRAY

FOR SERIES

8020, 8060, E010, E020, TP





	MATTE	GLOSS
	PART NO.	PART NO.
WHITE	798201000	484601000
BLACK	798202000	484602000
RED	798203000	484603000
ORANGE	798204000	484604000
YELLOW	798205000	484605000
GREEN	798206000	484606000
BLUE	798207000	484607000
BROWN	798208000	484608000
GRAY	798209000	484609000

FOR SERIES

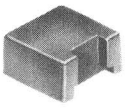
8020, 8060, E010, E020, TP

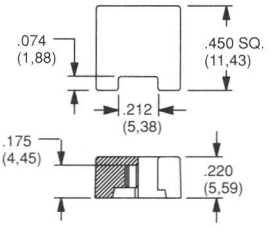
H

PUSHBUTTON CAPS

Special colors, custom marking available, consult factory. Material: Nylon. Finish: Round caps – gloss, Square caps – matte. Square caps w/LED cutout – matte or gloss.

FOR .122 DIA. PLUNGERS





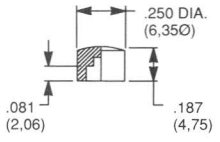
MATTE PART NO.	GLOSS PART NO.	
459701000	476801000	WHITE
459702000	476802000	BLACK
459703000	476803000	RED
459704000	476804000	ORANGE
459705000	476805000	YELLOW
459706000	476806000	GREEN
459707000	476807000	BLUE
459708000	476808000	BROWN
459709000	476809000	GRAY

FOR SERIES

8020, 8060

FOR .157 DIA. PLUNGERS



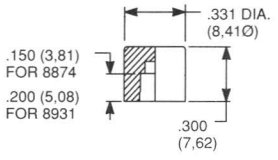


PART NO.	
479601000	WHITE
479602000	BLACK
479603000	RED
479604000	ORANGE
479605000	YELLOW
479606000	GREEN
479607000	BLUE
479608000	BROWN
479609000	GRAY

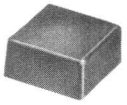
FOR SERIES

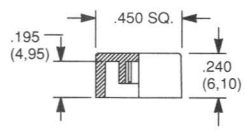
8500 (NOT AVAIL. WITH 85X1 MODELS)





PART NO.	PART NO.	
887401000	893101000	WHITE
887402000	893102000	BLACK
887403000	893103000	RED
887404000	893104000	ORANGE
887405000	893105000	YELLOW
887406000	893106000	GREEN
887407000	893107000	BLUE
887408000	893108000	BROWN
887409000	893109000	GRAY
FOR SERIES	FOR SERIES	
8500 (T OPTION W/ 85X2 AND 85X4 MODELS)	8500 (T OPTION W/ 85X2 AND 85X4 MODELS & T1 OPTION W/ ALL MODELS	





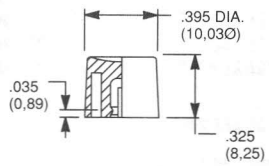
PART NO.	
448901000	WHITE
448902000	BLACK
448903000	RED
448904000	ORANGE
448905000	YELLOW
448906000	GREEN
448907000	BLUE
448908000	BROWN
448909000	GRAY

FOR SERIES

8500

FOR SNAP-FITTING PLUNGERS

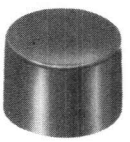


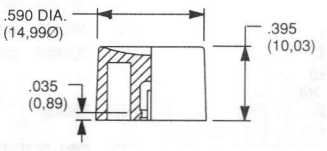


PART NO.	
894101000	WHITE
894102000	BLACK
894103000	RED
894104000	ORANGE
894105000	YELLOW
894106000	GREEN
894107000	BLUE
894108000	BROWN
894109000	GRAY

FOR SERIES

8020, 8060, E010, E020





PART NO.	
894001000	WHITE
894002263	BLACK
894003000	RED
894004000	ORANGE
894005000	YELLOW
894006000	GREEN
894007000	BLUE
894008000	BROWN
894009000	GRAY

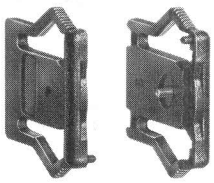
FOR SERIES

8020, 8060, E010, E020

H

END PLATES FOR CODED SWITCHES

3U SERIES



LEFT (W/HOLE) RIGHT (W/PIN)

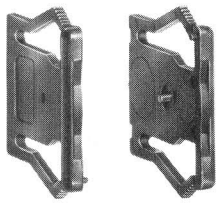
PART NO.

627502000 LEFT – BLACK
627509000 LEFT – GRAY

627602000 RIGHT – BLACK
627609000 RIGHT – GRAY

One left and right piece required for complete assembly.

3P SERIES



LEFT (W/HOLE) RIGHT (W/PIN)

PART NO.

623502000 LEFT – BLACK
623509000 LEFT – GRAY

623602000 RIGHT – BLACK
623609000 RIGHT – GRAY

One left and right piece required for complete assembly.

S2 SERIES

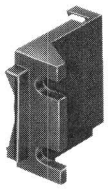


REAR MOUNT – STYLE S
WITH .157 (4MM) FLANGE

PART NO.

211702000 BLACK

Two required for complete assembly.



REAR MOUNT – STYLE R
WITH .315 (8MM) FLANGE

PART NO.

211802000 BLACK

Two required for complete assembly.



REAR MOUNT – STYLE T
WITH NO FLANGE

PART NO.

212002000 BLACK

Two required for complete assembly.



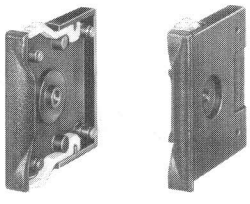
FRONT MOUNT – STYLE F

PART NO.

211902000 BLACK

Two required for complete assembly.

SF/SR SERIES



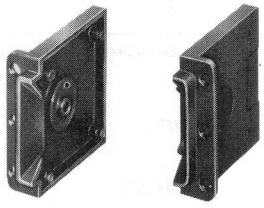
LEFT RIGHT

FRONT MOUNT – STYLE SF

PART NO.

234702000 LEFT – BLACK
234602000 RIGHT – BLACK

One left and right piece required for complete assembly.



LEFT RIGHT

REAR MOUNT – STYLE SR

PART NO.

211302000 LEFT – BLACK
211309000 LEFT – GRAY

211402000 RIGHT – BLACK
211409000 RIGHT – GRAY

One left and right piece required for complete assembly.

H

END PLATES FOR CODED SWITCHES

3 SERIES



FRONT MOUNT – STYLE O

PART NO.

413402000 BLACK
413409000 GRAY

Two required for complete assembly.



REAR MOUNT – STYLE 1

PART NO.

400402000 BLACK
400409000 GRAY

Two required for complete assembly.

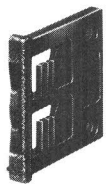


REAR MOUNT – STYLE 2

PART NO.

473202000 BLACK
473209000 GRAY

Two required for complete assembly.



FRONT MOUNT – STYLE 3

PART NO.

655702000 BLACK
655709000 GRAY

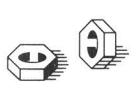
Two required for complete assembly.

HARDWARE FOR FIELD ASSEMBLY – 3 SERIES ONLY

SCREWS FOR FIELD ASSEMBLY OF THUMBWHEEL SWITCHES
(2 screws needed per assembly + 403500000 nuts.)

SCREW PART NUMBER (0–80 UNF THD. SIZE)	NUMBER OF SECTIONS IN ASSEMBLY				
	FRONT MOUNTING			REAR MOUNTING	
	MTG. STYLE – 0, 3 ASSY. TYPE – 0	MTG. STYLE – 0, 3 ASSY. TYPE – 3	MTG. STYLE – 0, 3 ASSY. TYPE – 4	MTG. STYLE – 1, 2 ASSY. TYPE – 0	MTG. STYLE – 1, 2 ASSY. TYPE – 4
412700000	1 – 2	1	1	1 – 2	1
412701000	3 – 4	2 – 3	2	3	2
412702000	5 – 7	4 – 5	3 – 4	4 – 6	3 – 4
412703000	8 – 10	6 – 8	5 – 6	7 – 9	5 – 6
412704000	11 – 13	9 – 10	7 – 8	10 – 12	7 – 8
412705000	14 – 16	11 – 13	9 – 10	13 – 15	9 – 10

See 3 Series mounting styles and assembly types, pages F-40 thru F-42.



NUT

PART NO.

403500000

2 nuts required per assembly and screws.



NUT DRIVER
(for 403500000 nut)

PART NO.

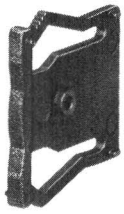
406100652

Not required for assembly. Not supplied with sample pieces.

H

SPACERS FOR CODED SWITCHES

3P SERIES

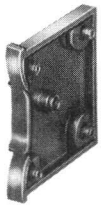


.100 THK.
(Makes section pitch .400.)

PART NO.

663602000 BLACK
663609000 GRAY

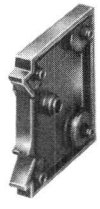
SF/SR SERIES



FRONT MOUNT – FITS STYLE SF
.150 THK.

PART NO.

212502000 BLACK



REAR MOUNT – FITS STYLE SR
.150 THK.

PART NO.

212202000 BLACK

3 SERIES



FRONT MOUNT – FITS STYLE 0 & 3
.185 THK.
(makes section pitch .500)

PART NO.

410602000 BLACK
410609000 GRAY



FRONT MOUNT – FITS STYLE 0 & 3
.078 (10mm) THK.
(makes section pitch 10mm)

PART NO.

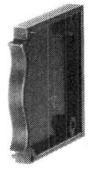
410802000 BLACK
410809000 GRAY



REAR MOUNT – FITS STYLE 1
.150 THK.
(makes section pitch .500)

PART NO.

410702000 BLACK
410709000 GRAY



REAR MOUNT – FITS STYLE 2
.150 THK.
(makes section pitch .500)

PART NO.

473602000 BLACK
473609000 GRAY

H

BLANK (INACTIVE) SECTIONS FOR CODED SWITCHES

3U SERIES

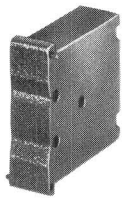
AVAILABLE SOON

BLANK SECTION
.300 THK.

PART NO.

664002000 BLACK
664009000 GRAY

3P SERIES

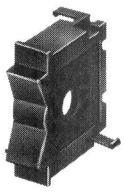


BLANK SECTION
.300 THK.

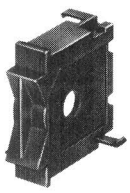
PART NO.

663702000 BLACK
663709000 GRAY

S2 SERIES



2127



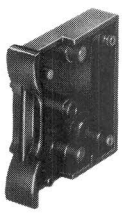
2290
W/RIB

BLANK SECTION
.315 THK.

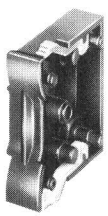
PART NO.

212702000 PLAIN – BLACK
229002000 W/RIB – BLACK

SF/SR SERIES



2126
W/RIB

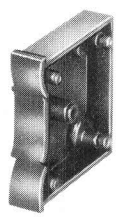


2348
W/RIB &
SPRINGS

FRONT MOUNT – STYLE SF
.312 THK.

PART NO.

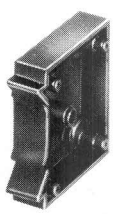
212602000 W/RIB – BLACK
234802000 W/RIB & SPRINGS – BLACK



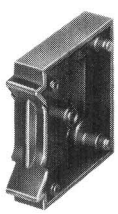
FRONT MOUNT – STYLE SF
.312 THK.

PART NO.

212402000 PLAIN – BLACK



2121



2123
W/RIB

REAR MOUNT – STYLE SR
.312 THK.

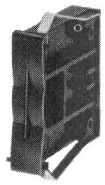
PART NO.

212102000 PLAIN – BLACK
212302000 W/RIB – BLACK

H

BLANK (INACTIVE) SECTIONS FOR CODED SWITCHES

3 SERIES



4136
W/RIB



4135
PLAIN

4005
W/RIB &
W/OUT
SPRINGS

4007
PLAIN &
W/OUT
SPRINGS

FRONT MOUNT – STYLE 0 & 3
.315 THK.

PART NO.

413602000 W/RIB – BLACK
413609000 W/RIB – GRAY

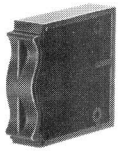
400502000 W/RIB & W/OUT SPRINGS – BLACK
400509000 W/RIB & W/OUT SPRINGS – GRAY

FRONT MOUNT – STYLE 0 & 3
.315 THK.

PART NO.

413502000 PLAIN – BLACK
413509000 PLAIN – GRAY

400702000 PLAIN & W/OUT SPRINGS – BLACK
400709000 PLAIN & W/OUT SPRINGS – GRAY



4006
W/RIB



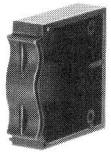
4008
PLAIN

REAR MOUNT – STYLE 1
.350 THK.

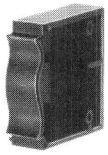
PART NO.

400602000 W/RIB – BLACK
400809000 W/RIB – GRAY

400802000 PLAIN – BLACK
400809000 PLAIN – GRAY



4734
W/RIB



4733
PLAIN

REAR MOUNT – STYLE 2
.350 THK.

PART NO.

473402000 W/RIB – BLACK
473409000 W/RIB – GRAY

473302000 PLAIN – BLACK
473309000 PLAIN – GRAY

H

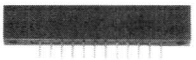
MISCELLANEOUS COMPONENTS

STOP PINS

	PART NO.
3 SERIES	402900000
3P SERIES	637800000
M SERIES	537100000
SF/SR & S2 SERIES	587300000

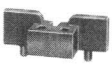
CONNECTOR – 3 SERIES

PART NO. 613801000



LED SUPPORT – KS SERIES

PART NO. 540300000



Z3 CONNECTOR

PART NO. 530100000



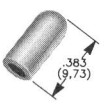
TOGGLE CAPS



VINYL

PART NO.	
706201000	WHITE
706202000	BLACK
706203000	RED
706204000	ORANGE
706205000	YELLOW
706206000	GREEN
706207000	BLUE
706208000	BROWN
706209000	GRAY

FOR SERIES: 7000, 9000, E, T



POLYETHYLENE

PART NO.	
896801000	WHITE
896802000	BLACK
896803000	RED
896804000	ORANGE
896805000	YELLOW
896806000	GREEN
896807000	BLUE
896808000	BROWN
896809000	GRAY

FOR SERIES: 7000, 9000, E



VINYL

PART NO.	
763701000	WHITE
763702000	BLACK
763703000	RED
763704000	ORANGE
763705000	YELLOW
763706000	GREEN
763707000	BLUE
763708000	BROWN
763709000	GRAY

FOR SERIES: 7000

WASHERS – M SERIES



PART NO.	
586800000	RUBBER PANEL SEAL
537200000	ADHESIVE MYLAR RETAINS STOP PINS

H

United States Distributors

ALABAMA

Allied Electronics	Huntsville	(205) 721-3500
Bell Industries	Huntsville	(205) 837-1074
Capstone Electronics	Huntsville	(205) 837-2141
Component Dist. Inc.	Huntsville	(205) 851-7800
Hall-Mark Electronics	Huntsville	(205) 837-8700
Newark Electronics	Birmingham	(205) 979-7003
Newark Electronics	Huntsville	(205) 837-9091
Newark Electronics	Mobile	(205) 471-6500
Newark Electronics	Montgomery	(205) 270-8074

ARKANSAS

Newark Electronics	Little Rock	(501) 225-8130

ARIZONA

Allied Electronics	Phoenix	(602) 437-9080
Bell Industries	Tempe	(602) 966-7800
Beswitched	Phoenix	(602) 275-4805
Capstone Electronics	Phoenix	(602) 437-0172
Control Design Supply	Tempe	(602) 829-7981
Hall-Mark Electronics	Phoenix	(602) 437-1200
LCOMP Inc.	Tempe	(602) 730-1633
Newark Electronics	Phoenix	(602) 864-9905
Newark Electronics	Phoenix	(602) 244-0133
Newark Electronics	Scottsdale	(602) 423-9532
Newark Electronics	Tempe	(602) 968-7441
Newark Electronics	Tucson	(602) 628-7891
Sterling Electronics	Phoenix	(602) 437-5565

CALIFORNIA

Allied Electronics	Chatsworth	(818) 882-6981
Allied Electronics	Fremont	(415) 770-0590
Allied Electronics	Irvine	(714) 727-3010
Allied Electronics	Rocklin	(916) 632-3104
Allied Electronics	San Diego	(619) 279-2550
Allied Electronics	Torrance	(213) 373-8828
Bell Industries	Agoura Hills	(818) 706-2608
Bell Industries	Cypress	(714) 895-7801
Bell Industries	Gardena	(213) 515-1800
Bell Industries	Los Angeles	(213) 826-6778
Bell Industries	Rocklin	(916) 652-0414
Bell Industries	San Diego	(619) 268-1277
Bell Industries	Sunnyvale	(408) 734-8570
Cal-Switch	Cupertino	(408) 279-8848
Cal-Switch	Gardena	(213) 770-2330
Cal-Switch	San Francisco	(415) 621-7386
Capstone Electronics	Chatsworth	(818) 701-1424
Capstone Electronics	San Diego	(619) 277-7767
Capstone Electronics	San Jose	(408) 453-9804
Capstone Electronics	Tustin	(714) 730-0349
Cypress Electronics	Buena Park	(714) 521-5230
Cypress Electronics	San Diego	(619) 535-0011
Cypress Electronics	Santa Clara	(408) 980-8400
Cypress Electronics	Woodland Hills	(818) 710-7780
Hall-Mark Electronics	Chatsworth	(818) 773-4500
Hall-Mark Electronics	Irvine	(714) 727-6000
Hall-Mark Electronics	Rocklin	(916) 624-9781
Hall-Mark Electronics	San Diego	(619) 268-1201
Hall-Mark Electronics	San Jose	(408) 432-4000
Harper S.I.D.	Compton	(213) 979-5090
Harper S.I.D.	San Diego	(619) 578-2500
Harper S.I.D.	San Jose	(408) 943-9490
Integrated Elect. Corp.	Sacramento	(916) 363-6030
Master Distributors	Santa Monica	(213) 452-1229
Newark Electronics	Anaheim	(714) 978-8111
Newark Electronics	Camarillo	(805) 389-7450
Newark Electronics	Canoga Park	(818) 888-3718
Newark Electronics	Carson	(213) 516-6511
Newark Electronics	Cerritos	(213) 404-0111
Newark Electronics	Culver City	(213) 670-0020
Newark Electronics	Dublin	(415) 833-9449
Newark Electronics	El Monte	(818) 443-3792
Newark Electronics	Elk Grove	(916) 686-8400
Newark Electronics	Foster City	(415) 572-8300
Newark Electronics	Long Beach	(213) 427-7408
Newark Electronics	Los Angeles	(213) 664-5252
Newark Electronics	Los Gatos	(408) 356-1300
Newark Electronics	Martinez	(415) 372-3315
Newark Electronics	Milpitas	(408) 262-0121
Newark Electronics	Milpitas	(408) 945-1801
Newark Electronics	Mountain View	(415) 964-5381
Newark Electronics	Orange	(714) 634-8224
Newark Electronics	Riverside	(714) 784-1101
Newark Electronics	Sacramento	(916) 971-9555
Newark Electronics	San Bernardino	(714) 383-1437
Newark Electronics	San Diego	(619) 268-1717
Newark Electronics	San Diego	(619) 453-8211
Newark Electronics	San Diego	(619) 569-9877
Newark Electronics	San Jose	(408) 559-6900
Newark Electronics	San Mateo	(415) 571-5300
Newark Electronics	San Ramon	(415) 743-0250
Newark Electronics	Santa Fe Springs	(213) 929-9722
Newark Electronics	Torrance	(213) 791-2664
Newark Electronics	Tustin	(714) 669-1641
Newark Electronics	Tustin	(714) 838-8511
Newark Electronics	Van Nuys	(818) 988-0015
Newark Electronics	Ventura	(805) 644-2265
PSC Electronics	Sunnyvale	(408) 737-1333
Shelley-Ragon Elect.	Chatsworth	(818) 998-3333
Steven Engineering	S. San Francisco	(415) 588-9200
Wes-Garde Components	Van Nuys	(818) 786-3724

COLORADO

Allied Electronics	Englewood	(303) 790-1664
Bell Industries	Wheatridge	(303) 424-1985
Capstone Electronics	Aurora	(303) 375-1300
Capstone Electronics	Englewood	(303) 790-7644
Denver Beta Wintronics	Arvada	(303) 431-7161
Hall-Mark Electronics	Englewood	(303) 790-1662
Integrated Elect. Corp.	Denver	(303) 292-6121
Integrated Elect. Corp.	Denver	(303) 292-5537
Kimball Electronics	Englewood	(719) 528-7066
Newark Electronics	Boulder	(303) 440-6753
Newark Electronics	Colorado Springs	(719) 576-2644
Newark Electronics	Denver	(303) 757-3351
Newark Electronics	Denver	(303) 373-4540
Newark Electronics	Thornton	(303) 428-0113

United States Distributors

CONNECTICUT

Allied Electronics	Cheshire	(203) 272-7730
Capstone Electronics	Wallingford	(203) 265-4001
Hall-Mark Electronics	Cheshire	(203) 271-2844
Midan Electronics	Wallingford	(203) 265-2077
Newark Electronics	Bloomfield	(203) 243-1731
Newark Electronics	East Hartford	(203) 289-1416
Newark Electronics	Meridan	(203) 630-2239
Newark Electronics	South Windsor	(203) 282-7310
Park Distributors	Bridgeport	(203) 366-7200
Sager Elect. Supply	Wallingford	(203) 265-4600
Sterling Electronics	Wallingford	(203) 265-9535
Wes-Garde Components	Hartford	(203) 527-7705

FLORIDA

Allied Electronics	Casselberry	(407) 831-3331
Allied Electronics	Largo	(813) 541-4660
Allied Electronics	Pompano Beach	(305) 978-3008
Bell Industries	Altamonte Springs	(407) 339-0078
Capstone Electronics	Deerfield Beach	(305) 492-1211
Capstone Electronics	Lake Mary	(407) 333-9768
Electronic Equipment	Miami	(305) 526-6000
Electronic Equipment	Tampa	(813) 988-0810
Hall-Mark Electronics	Casselberry	(407) 830-5855
Hall-Mark Electronics	Largo	(813) 541-7440
Hall-Mark Electronics	Pompano Beach	(305) 971-9280
Hammond Electronics	Ft. Lauderdale	(305) 973-7103
Hammond Electronics	Orlando	(407) 849-6060
Newark Electronics	Boca Raton	(407) 241-0605
Newark Electronics	Clearwater	(813) 443-0661
Newark Electronics	Ft. Myers	(813) 275-6310
Newark Electronics	Jacksonville	(904) 399-5041
Newark Electronics	Melbourne	(407) 727-3205
Newark Electronics	Miami	(305) 593-2686
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Newark Electronics	Ocala	(904) 867-1114
Newark Electronics	Orlando	(407) 240-1400
Newark Electronics	Orlando	(407) 896-8350
Newark Electronics	Pembroke Pines	(305) 436-8004
Newark Electronics	Plantation	(305) 424-4400
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Newark Electronics	Tampa	(813) 287-1578
Peerless Radio	Pompano Beach	(305) 973-4141
Reptron Electronics	Ft. Lauderdale	(305) 735-1112
Reptron Electronics	Tampa	(813) 854-2351
Sager Elect. Supply	Orlando	(407) 240-3114
Wes-Garde Components	Lakeland	(813) 644-7564

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Hall-Mark Electronics	Duluth	(404) 623-4400
Hammond Electronics	Norcross	(404) 449-1996
Newark Electronics	Atlanta	(404) 761-9902
Newark Electronics	Atlanta	(404) 951-2363
Newark Electronics	Macon	(912) 743-2446
Newark Electronics	Norcross	(404) 448-1300
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Newark Electronics	Peachtree	(404) 631-0015
Newark Electronics	Stone Mountain	(404) 508-8430
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Allied Electronics	Wood Dale	(708) 860-0007
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Hawk Electronics	Wheeling	(708) 459-4030
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Klaus Radio	Lasalle	(815) 223-7400
Klaus Radio	Peoria	(309) 691-4840
Klaus Radio	Quincy	(217) 223-7560
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Lectro Components	Carol Stream	(708) 690-0520
Newark Electronics	Addison	(708) 941-7200
Newark Electronics	Arlington Heights	(708) 392-9009
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Newark Electronics	Libertyville	(708) 362-2248
Newark Electronics	Palos Hills	(708) 430-0690
Newark Electronics	Peoria	(309) 693-3771
Newark Electronics	Rockford	(815) 229-0225
Newark Electronics	Schaumburg	(708) 310-8980
Newark Electronics	Schaumburg	(708) 843-0700
Reptron Electronics	Schaumburg	(708) 882-1700
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Allied Electronics	Indianapolis	(317) 875-0448
Altex Electronics	Carmel	(317) 848-1323
Bell Industries	Ft. Wayne	(219) 423-3422
Bell Industries	Indianapolis	(317) 875-8200
Capstone Electronics	Indianapolis	(317) 290-9114
Custom Service Elect.	Indianapolis	(317) 879-9119
Hall-Mark Electronics	Indianapolis	(317) 872-8875
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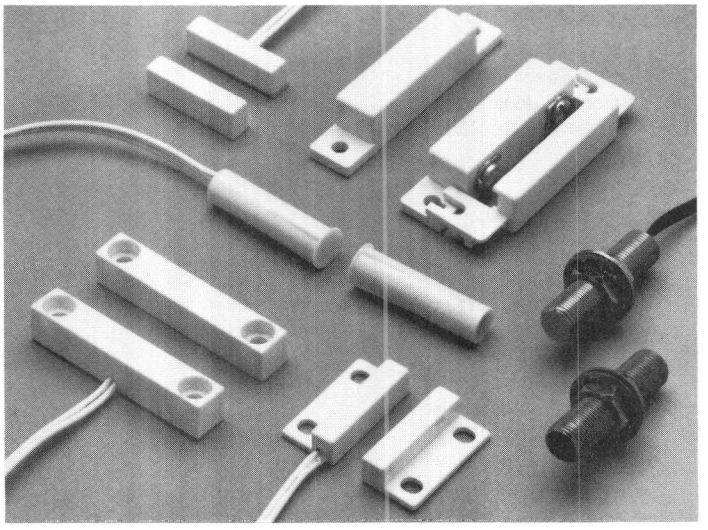
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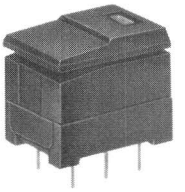
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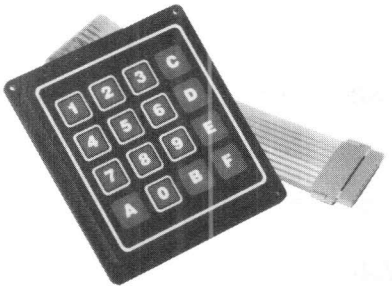
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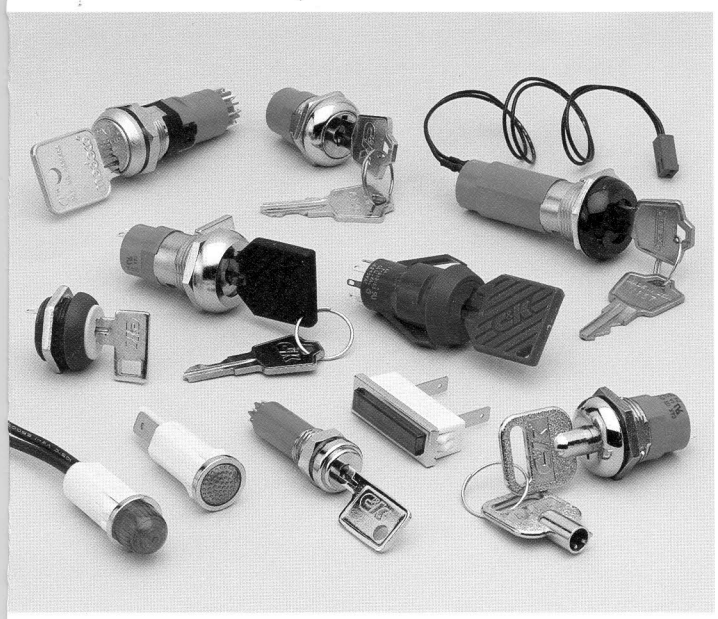
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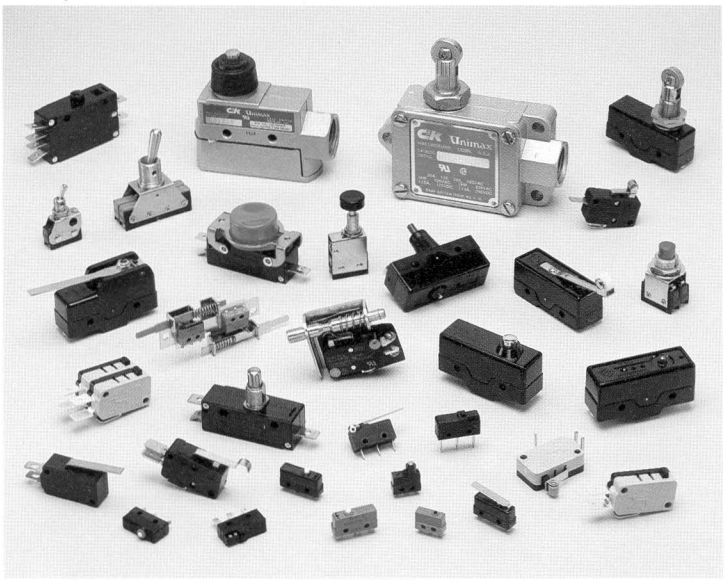
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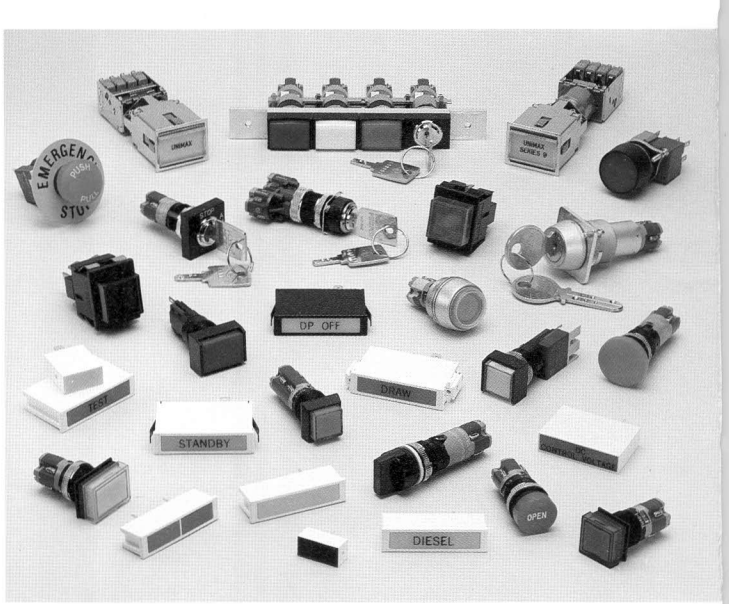
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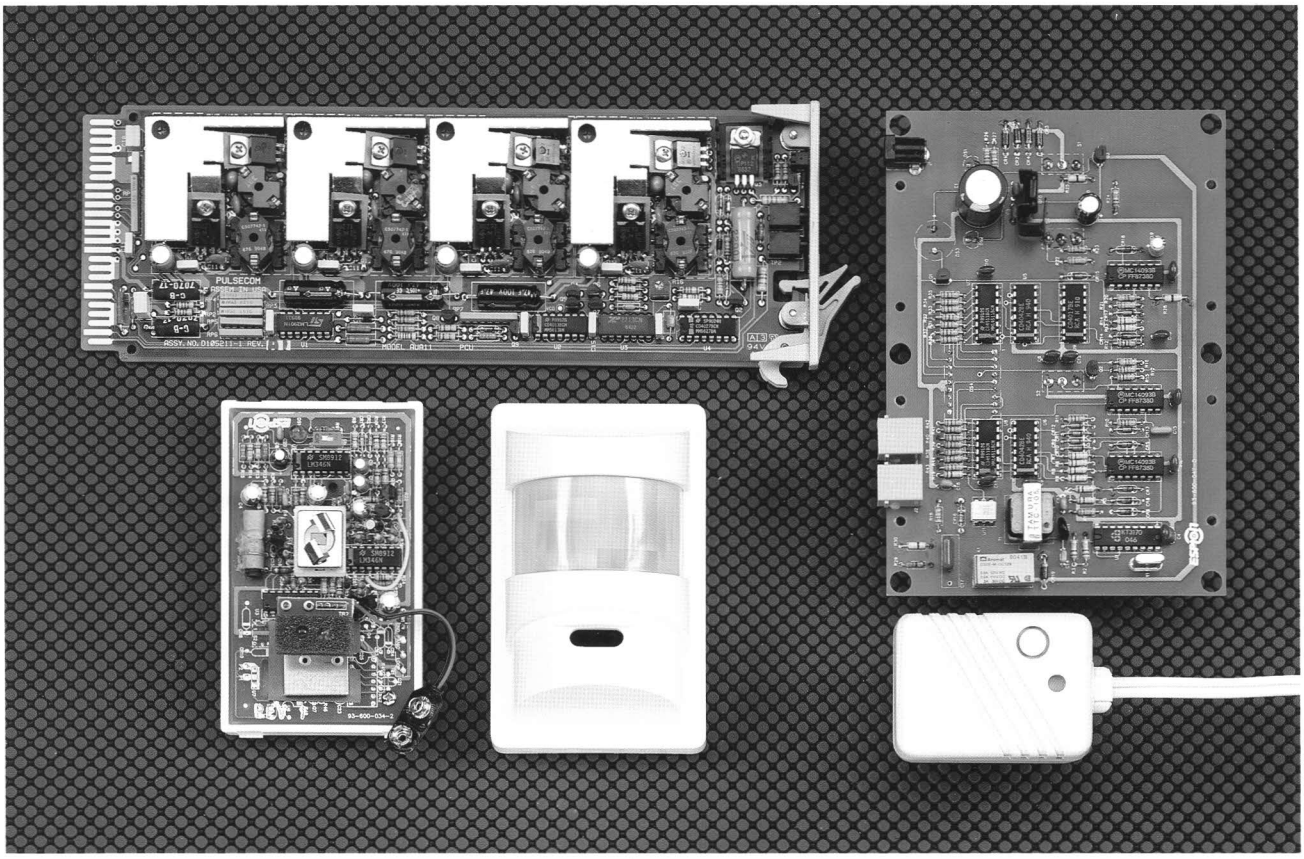




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